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for
TESTING and MATERIALS



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FOREWORD

The *Proceedings* of the American Society for Testing and Materials are published annually and include all committee reports offered to the Society during the current year. Technical papers previously included in *Proceedings* will be found, beginning in 1966, in the *Journal of Materials*, published quarterly in March, June, September, and December.

A complete subject and author index of papers and reports published by the Society, also previously a part of *Proceedings*, will be found in the December issue of *Materials Research & Standards*, beginning in 1967.

A list of the Special Technical Publications published by the Society in 1970 is given at the end of this volume. This supplements the lists appearing in the *Proceedings* from 1948 through 1969 covering all special publications published by the Society up to and including 1969.

Nothing contained in any publication of the American Society for Testing and Materials is to be construed as granting any right, by implication or otherwise, for manufacture, sale, or use in connection with any method, apparatus, or product covered by Letters Patent, nor as insuring anyone against liability for infringement of Letters Patent.

The Society is not responsible, as a body, for the statements and opinions advanced in this publication.

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SUMMARY OF THE SEVENTY-THIRD ANNUAL MEETING

TORONTO, ONTARIO, CANADA, JUNE 21-26, 1970

The 73rd Annual Meeting of the American Society for Testing and Materials, including the North American Materials Exposition, was held in Toronto, Canada, June 21-26, 1970, with headquarters at the Royal York Hotel. The registered attendance of members and visitors for the meeting was 3534, and it is estimated that 700 registered separately for the family events program arranged by the host committee.

The meeting began informally on Sunday afternoon with an open forum, at which time President L. S. Crane announced the appointment of William T. Cavanaugh as the new Managing Director of ASTM, effective on June 19, 1970.

On Monday, the exposition and meeting were formally opened with greetings from the Mayor of Etobicoke, a suburb of Toronto; President Crane; John S. Wheeler, General Chairman of the Annual Meeting; and the Managing Director.

During the week there were 38 technical sessions, two luncheons, open meetings of the Committee on Standards, and the Gillett and Marburg Lectures.

The President's Luncheon on Tuesday included the conferral of five new honorary

memberships and introduction of the newly elected Society officers and retiring officers. Featured was an address by L. S. Crane entitled "The Challenge of the 70's." The new officers are: President (one-year term)—R. B. Smith; Vice-President (two-year term)—G. H. Nelson; Directors (three-year terms)—S. M. Brown, W. G. Holtz, Bryant Mather, H. O. McMahon, L. W. Shuger, A. T. Smith.

On Wednesday at the annual Awards Luncheon fifty-year members were recognized and Society awards were conferred, concluding with an address by the recipient of the ASTM Award to Executives, Howard O. McMahon.

The meeting was reconvened the following week, June 28-July 1, 1970, with a six-session symposium and committee meetings of Committee E-10 on Radioisotopes and Radiation Effects in Niagara Falls, New York, and Ontario.

The details of the technical program were published in the May 1970 issue of *Materials Research and Standards* and are, therefore, not printed here. The names of honorary members and award recipients are printed in the Annual Report of the Board of Directors published elsewhere in this volume.

1970 ANNUAL REPORT OF THE BOARD OF DIRECTORS

On April 9, 1970, Thomas A. Marshall, Jr., Managing Director of the Society since October 15, 1960, passed away at home after a brief illness.

At a meeting on May 4, 1970, the Board of Directors of ASTM unanimously passed the following resolution:

WHEREAS, The directors of the American Society for Testing and Materials desire to record their deep sorrow at the death on April 9, 1970, of their esteemed Managing Director Thomas Alfred Marshall, Jr., who also served, since October 15, 1960, as secretary of the Society, be it

RESOLVED, That the Board of Directors of this Society hereby gives formal expression of its grievous loss in the death of Thomas A. Marshall, Jr., and does hereby note in its records the passing of a man who was esteemed by his associates, loved by his friends and respected by all.

RESOLVED FURTHER, That a copy of this resolution be tendered to his family as a humble expression of the Board's heartfelt sympathy in its bereavement.

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Highlights

The cumulative effects of a variety of accomplishments in all areas of activities have resulted in a significantly productive year for the Society which continues to grow in membership, to expand and diversify its technical activities, and to extend its leadership and impact in the field of standardization.

Further studies were made of the Society's long-range plan as directed by the Board in May 1969. A statement of the plan—"ASTM in the '70s"—appears in the November 1969 issue of *Materials Research &*

Standards. The long-range plan is a continuing program, constantly under study for any changes that will enable the Society to fulfill more effectively its responsibilities and mission. An annual revision of the plan will be submitted to the Board of Directors each September.

Progress was made toward the long-range goals when the Bylaws of the Society were amended on two occasions during the past year: first by a letter ballot following the reconvened business meeting of 23 June (see

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p. 1, *Proceedings*, Vol 69) and, second, by a letter ballot following a special business meeting held 17 December 1969.* This resulted in a revision of the membership and dues structure to take effect in 1971 and in the revision of the standardization procedure by merging of the former Annual Meeting and interim procedures for the adoption of standards. Other notable effects included removal of subscription fees from the Bylaws (changes in fees are still subject to ratification by the membership); a provision for amending the Bylaws between Annual Meetings; and a change in the title of the chief administrative officer from executive secretary to managing director.

A program is underway to expand the computerization of the Society's technical committee records, including the rosters of all subcommittees. This will enable the Society to furnish current rosters of subcommittees, which has never been possible, in addition to the rosters for main committees. It is expected that these records will be completed by 1 November 1970. This information is essential to the smooth transition to the new membership structure mentioned above.

Included in the Society's long-range plan are proposals to assist the districts to take a more active role. To administer such increased activity, the Standing Committee on District Activities has been discharged and in its place is the District Activities Council composed of one member and one alternate from each district which will meet each year at the Annual Meeting. In addition, a new Standing Committee on Districts has been created, and this committee will meet at least four times a year. It will act as the executive committee of the District Activities Council and to advise the Board of general policy concerning district activities.

Achievements in technical activities included authorization of a new Committee on Physical Evidence in Forensic Science. This committee will be concerned with analysis of physical evidence in crime investigation. Problem areas that will be covered are microimage analysis (bullet marks, tool marks, fibers, hairs, etc.), macroimage analysis (handwriting, documents, tool, etc.), forensic biology and chemistry (blood types, perspira-

tion types, toxicology, immunology, drug identification, paint identification, etc.).

An Insulating Glass Research Program was initiated in cooperation with the National Bureau of Standards. The project will establish, through Committee E-6 on Performance of Building Constructions, a research associateship; develop test methods, performance standards, and prototype apparatus for evaluation of long-term seal durability of factory-fabricated insulating glass units by regulatory agencies, testing laboratories, manufacturers, suppliers, and consumers. The resulting information will be made available to these organizations.

A conference was held this spring to further the organization of an ASTM Committee on Computerization of Laboratory Instruments to serve as a focus for laboratory computerization techniques. Areas that have been assessed are programs, software, and language to acquire, manipulate, and print out data on chemicals, drugs, body fluids, etc., for analysis and quality control.

The seven subdivisions of the Flammability Section of Committee D-13 on Textile Materials have been working on the development of test methods and standards for flammability of textile materials used in a number of consumer areas. The sections cover apparel; drapes; bedding, mattresses, stuffed furniture, and toys; blankets, sheets, quilts, and bed pads; protective clothing; tents, tarpaulins and outdoor fabrics; and transportation fabrics. One special purpose is to develop methods for pinpointing and anticipating the fire hazards in consumer textile materials. This should help avoid material loss and personal injury from the accidental burning of these textile materials. The first flammability test method for finished floor coverings was approved in the spring of this year.

In response to an urgent need to develop methods for ambient air sampling and analysis, the Board approved a cooperative test program, under the sponsorship of Committee D-22 on Sampling and Analysis of Atmospheres. The program envisions the evaluation of up to 40 methods of sampling and analysis of the atmospheres based primarily

* A copy of the Bylaws as revised is included at the end of this report.

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on the use of six contracting laboratories and is under the direction of a research associate based at the National Bureau of Standards. Estimated cost, if the complete projected program can be carried out, is in the area of \$2 million, to be raised by solicitation of industry. Two new developments of particular interest in Committee D-22 were a method of sampling stacks for particulate matter and a recommended practice for laboratories engaged in sampling and analysis of atmospheres.

In January 1970, the Board viewed the first of what is expected to be a long line of educational films based on ASTM standards. On 16-mm color film, the eight-minute production demonstrates the basic skills required to perform the Standard Method of Test for Density of Plastics by the Density-Gradient Technique (D 1505). The idea for this film grew out of two earlier projects, initiated by two of the Committee D-20 vice-chairmen, which resulted in an 8-mm film and a video tape demonstrating an indentation hardness test. A preliminary study showed that some 800 to 1200 ASTM test methods and recommended practices may be suitable for this medium, and present plans are to make such films available for sale or rent through ASTM headquarters.

In membership, the Society's growth is continuing steadily. In 1969, emphasis was continued on the programs with decision-making managements to expand the organizational memberships in the Society. These programs have proven to be fruitful along with the program for upgrading individual memberships to organizational class.

In the publications operations, the first

complete redesign and resetting of the *Annual Book of ASTM Standards* in three decades was started. About three years will be required to complete the task.

The Committee on Publications was restructured in 1969 and broad policies set for all ASTM publications. This, combined with the improvement in the quality of material selected for publication, a comprehensive marketing program, and a rapid and cost-conscious production program, gave the publications division its most productive year in the history of the Society.

Marked improvements in *Materials Research & Standards* have been made, resulting in a journal of excellence that has been reflected in advertising revenue.

The Society has concentrated on the restructuring of its meetings to serve the technical committees more efficiently. A program was inaugurated to develop nine National Committee Weeks a year which, it is anticipated, will be fully instituted in two or three years.

The scope of the North American Materials Exposition has been broadened to include new materials and materials systems which will not only increase the number of eligible participants but will increase the areas of interest for members and others attending the exposition.

The Society's financial operations continued to improve during the past year with new highs in both income and expense. Net income in 1969 was \$133,984 (92.5 percent) more than the 1968 income. The swing over a two-year period from an operating loss of \$135,917 to a gain of \$278,035 was \$413,952.

Technical Activities

Only the technical activity items requiring action by the Board of Directors are included here. For complete information on the Society's technical activities reference should be made to the annual reports of the individual technical committees and the standing committees of the Society.

Aerospace Industry Methods

Last year the authorization of new Committee F-7 on Aerospace Industry Docu-

mentation of Materials was described in detail. During the organization process a new title and scope evolved and was finally approved by the Board of Directors as follows:

Title—Committee F-7 on Aerospace Industry Methods.

Scope—The promotion of knowledge of aerospace, aircraft and allied industry materials test methods and techniques and the provision of standards for use in industry through their adoption by, or development within, ASTM Committee F-7 and by recommendations to

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other ASTM technical committees or to other technical organizations.

Documentation, including methods of test, recommended practice, nomenclature, specifications and related technical information developed by this committee and by others with their consent, will be coordinated, letter balloted or otherwise promulgated.

Areas of standards developments applicable to this scope, but under the jurisdiction of other ASTM committees or other organizations are excluded from development by this committee unless those other technical bodies do not choose to act directly on the development of specific standards needed by the aerospace, aircraft and allied industries. In such cases, Committee F-7 may elect to develop, letter ballot, coordinate and promulgate the needed standards.

Protective Equipment for Sports

Also described last year was the authorization of a new committee on protective sports equipment. Formal approval has been given by the Board of Directors to the following title and scope and much activity is underway:

Title—Committee F-8 on Protective Equipment for Sports.

Scope—Standardization of specifications, test methods, and recommended practices for protective equipment for sports and related materials to minimize injury. Promotion of knowledge as it relates to protective equipment standards. Coordination of this work with other ASTM technical committees and other organizations in this area.

Coordinating Committee on Material Specifications for Nuclear Service

This coordinating committee was formed in 1965 primarily as a forum for exchange of information regarding current and proposed activities on standards for the nuclear industry. When USASI reorganized its nuclear standards activities in 1966, ASTM agreed to sponsor USA Standards Committee N11 on Basic Materials and Materials Testing Involved in Nuclear Applications. It became evident that N11 fulfills the functions of the ASTM Coordinating Committee and therefore the Coordinating Committee was discharged with thanks by the Board of Directors in May 1969.

Mechanical Testing

The 1969 Annual Report described the splitting off of 10 subcommittees from Committee E-1 on Methods of Testing to form

the new Committee E-28 on Mechanical Testing. Following an organization meeting the following scope was submitted to and approved by the Board of Directors:

Scope—The promotion of the development of methods of mechanical testing by: (a) Aiding and advising technical committees in the preparation of methods and recommended practices and in the development of apparatus. (b) Formulating general methods of tests and recommended practices which involve the measurement of specific mechanical properties or quantities. (c) Sponsoring technical meetings and symposia independently or in cooperation with other organizations. (d) Promoting research and development of methods of mechanical tests. (e) Standardization of the nomenclature and definitions used in or relating to mechanical testing methods or apparatus. (f) Cooperation with other standardizing bodies in the interest of national and international uniformity.

Revised Committee Scopes and Titles

Committee A-1 on Steel—Although Committee A-1 has been promulgating specifications for steel products for specific applications for many years this fact has never been recognized in its scope. A revised scope, approved by the Board of Directors on 13 May 1969 recognizes the fact:

Scope—The promotion of knowledge, stimulation of research, and the development of specifications, methods of test, definitions and nomenclature, and recommended practices pertaining to steel, plain carbon and alloyed, cast or wrought, for general engineering use or for specific purpose applications.

Committee B-2 on Nonferrous Metals and Alloys—Committee B-2 has found it desirable to develop specifications for solder fluxes. As a result the following revised scope was approved by the Board of Directors on 13 May 1969:

Scope—Developing and maintaining specifications covering composition, properties, dimensions, and quality standards, and developing and maintaining methods of testing, definitions, classifications, and nomenclature for nonferrous metals and their alloys, for refinery or mill products made therefrom and for solder fluxes.

The materials covered in this scope are solder fluxes and nonferrous metals and alloys, excluding: the light metals, die-casting alloys, reactive and refractory metals and alloys, cast and wrought non-refinery products of copper and copper alloys, electronic grade alloys, alloys classified as super alloys, and metal powders. Coordinating subcommittees consisting of representatives of the committees concerned will

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resolve questions of jurisdiction subject to the approval of the parent committees.

Committee C-7 on Lime—The desirability of promulgating specifications for material related to lime, such as fly ash and other pozzolans, prompted Committee C-7 to expand its scope in this direction. On 20 January 1970 the Board of Directors approved the following revised scope for Committee C-7:

Scope—The stimulation of research and the development and formulation of specifications, methods of test, and definitions for lime and lime products, and related materials for use with lime, which find use in the chemical, industrial, construction, and agricultural fields; and for limestone and limestone products as they are used in the chemical, industrial, and agricultural fields. Such products shall particularly include quicklime, hydrated lime, and limestone.

Committee C-13 on Concrete Pipe—The Board of Directors on 9 September 1969 approved the following revised scope for Committee C-13 to include joints:

Scope—The scope of the committee shall include the formulation of specifications, methods of tests for concrete pipe (reinforced and non-reinforced) and factory made compression and self-energizing joints used for constructing sewers, culverts, and irrigation and drainage systems.

Committee D-1 on Paint, Varnish, Lacquer, and Related Products—After further discussions with Committee C-3 on Chemical-Resistant Nonmetallic Materials a rewording of the exclusion of certain types of floor coatings from the D-1 scope has been mutually agreed upon. On 9 September 1969 the Board of Directors approved the following revised scope for Committee D-1:

Scope—Test methods, definitions, recommended practices, and specifications for (1) paint, varnish, lacquer, and related products in liquid, liquefiable, or mastic form, (2) components thereof, (3) preparation of surfaces to which such coatings are applied, and (4) paint-substrate systems.

Specified paint-related product exceptions are (1) bituminous and non-bituminous materials for roofing, (2) bituminous materials for roadways, (3) penetrating wood preservatives, (4) electrical insulating varnishes, (5) elastomer coated fabrics, (6) waxes and polishes, (7) heavily filled, trowelable, chemically resistant floor coatings, and (8) elastomeric joint sealants.

Committee D-18 on Soil and Rock for

Engineering Purposes—Committee D-18 has revised its scope editorially to be consonant with the general outline of technical committee scopes recommended by the Committee on Technical Committee Operations. The revised scope was approved 20 January 1970 by the Board of Directors to read as follows:

Scope—The promotion of knowledge, stimulation of research and the development of specifications, and methods for sampling and testing, nomenclature and definitions, and recommended practices relating to the properties and behavior of soil and rock for engineering purposes. Excluded are the uses of rock for building stone and for constituent materials in portland cement and bituminous paving and structures coming under the jurisdiction of other committees.

It will be the policy of this committee to avoid, insofar as it is possible, dealing with methods of design of engineering structures and all those features of general practice in the use of soil and rock as engineering materials which may not comprise methods of sampling and testing. It will, however, be considered within the scope of the committee's work to promote by every desirable means the close cooperation of other organizations and committees whose field of endeavor is closely allied to that of soil and rock testing.

Committee E-6 on Methods of Testing Building Construction—To more appropriately indicate Committee E-6 activities the Board of Directors on 13 May 1969 approved a change of title to now read "Committee E-6 on Performance of Building Constructions."

Committee E-7 on Nondestructive Testing—Committee E-7 proposed to the Board and the Board accepted on 9 September 1969 an editorial revision of its scope to read as follows:

Scope—1.1 Promotion of knowledge, advancement of the technology, and stimulation and sponsorship of research, with regard to nondestructive testing of engineering materials, structures and assemblies, for discontinuities, structural irregularities or characteristics, and extensions of the methods used to other materials and process engineering problems.

1.2 The formulation of requirements relating to the performance, interpretation and classification of results of such tests, without prejudice to the jurisdiction of product committees over their respective products.

1.3 The coordination and review of nondestructive testing clauses initiated by other committees or included in documents prepared jointly with other organizations.

1.4 Liaison, to include coordination and consultation where desirable with the other ASTM

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technical committees as well as other organizations associated with nondestructive testing.

Area of Interest—The principal area of interest of Committee E-7 includes the traditional nondestructive test methods such as radiographic, magnetic particle, penetrant, ultrasonic, electromagnetic (eddy current) and leak testing methods and their applications and extensions as delineated in the scope; also other methods which have been or may be developed which are nondestructive and have similar objectives, applications or extensions. The scope does not include determination or promulgation of acceptance standards for products subjected to nondestructive tests; these are the prerogatives of the product committees. However, it may include consultative or advisory effort in that area by request of any product committee, or internally generated reference material for use and designed to facilitate the product committees' task of establishing such standards.

Committee E-24 on Fracture Testing of Metals—On 20 January 1970 the Board of Directors approved a change in Paragraph (b) of the scope of Committee E-24 from "Formulating specifications and methods of fracture testing of metals, exclusive of fatigue testing" to now read "Developing recommended practices, methods of test, definitions, and nomenclature for fracture testing of metals, exclusive of fatigue testing."

Committee F-5 on Carbon Paper, Inked Ribbon and Other Similar Image Producing Products—Committee F-5 originally began work on carbon paper and typewriter ribbon products in 1966. As time passed, the membership of the committee grew and their areas of interest broadened to include items

which were not specifically named or implied in the original name and scope. The areas of interest which became apparent were not and are not currently covered by any other ASTM activity. Since the business community is now purchasing and using a number of copying and duplicating systems other than the conventional systems which have been with us for decades, a means of providing test methods to be used for analysis and specifications are required in order to protect both producers and consumers. The membership of Committee F-5 has indicated overwhelming support of expanding its operation into these areas where current uniformity of testing and evaluation are lacking.

On 20 January 1970 the Board of Directors approved the following new title and scope for Committee F-5:

Title—Committee F-5 on Business Copy Products.

Scope—The promotion of knowledge, stimulation of research, and the development of methods of test, definitions and nomenclature, and recommended practices, relating to supplied used in imaging, copying, and duplicating systems in the general area of business communications.

This scope is intended to include those materials, processes, and systems commonly used in the general area of business communications and the quality of images or copies produced.

(The scope is not intended to include conventional silver halide photography and systems not widely used in the business community.)

These activities will be coordinated with those of other related committees of ASTM and other organizations.

Membership

In 1969 the Society's membership reached a total of 15,750 members. This compares with the 1968 total of 15,709. Although the net increase of total members was but 41, the significance lies in the fact that, in accordance with the instructions of the Board, Membership Development activities were concentrated upon programs with decision-making managements to expand the organizational memberships in the Society. Total net increase for 1969 exceeded the goals set in the fall of 1968 by 20 new memberships.

This resulted in a net gain in 1969 of ten Sustaining Memberships as compared to a

—2 in 1968; 477 Industrial Memberships as compared to 99 in 1968; 123 Institutional Memberships against 52 for 1968, for a total of 610 new organizational members in 1969 comparing with an increase of 149 in 1968. The resulting resignations of Personal Memberships was significant because of this change. There was a total of 264 Personal resignations out of the 368 total due to the upgrade program.

Of the 360 members who requested in late 1968 that their memberships be upgraded to an Organizational class in 1969, 345 of these requests were completed. The member-

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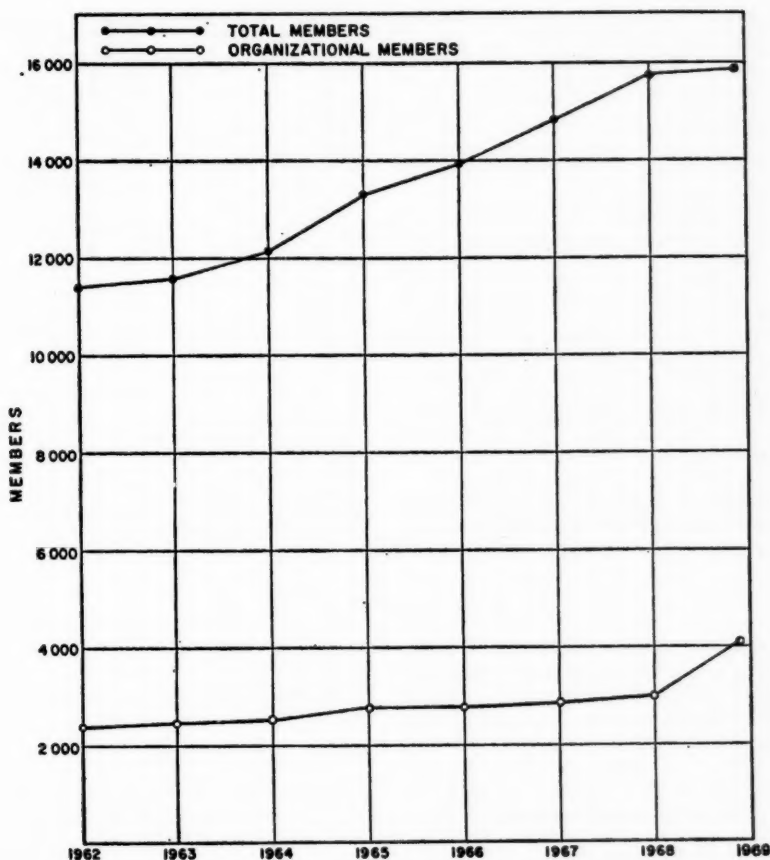
	Organizational Members				Individual Members						Grand Total
	Sustaining	Industrial*	Institutional*	Total	Honorary	Dues Exempt*	Personal	Senior Associate	Associate	Total	
1 Jan. 1969.....	370	2309	1275	3954	42	301	10 457	79	876	11 755	15 709
Add:											
New Members.....	13	579	156	748	1	1	1 023	10	205	1 240	1 988
Reinstatements or renews.....	0	24	12	36			103	3	6	112	148
Transfers to.....	10	9	1	20	3	38	260	11		312	332
Total additions.....	23	612	169	804 ^b	4	39	1 386	24	211	1 664	2 468
Deduct:											
Deaths.....						11	51	1	3	66	66
Resignations.....	5	48	24	77		2	825 ^c	6	34	867	944
Dropped.....		77	22	99			829	4	157	990	1 089
Transfers from.....	8	10		18		3	49	2	256	310	328
Total deductions.....	13	135	46	194		16	1 754	13	450	2 233	2 427
Net change 1969.....	10	477	123	610	4	23	-368	11	-239	-569	41
Total membership 31 Dec. 1969.....	380	2786	1398	4564	46	324	10 089	90	637	11 186	15 750
% of Total.....	2.4	17.7	8.9	29		10 459		0.6	4	71	100
						66.4					
Membership goal 31 Dec. 1969.....	380	2775	1375	4530		10 400		100	700	11 200	15 730
% of Total.....	2.4	17.6	8.8	28.8		66.1		0.6	4.5	71.2	100
Total membership 31 Dec. 1968.....	370	2309	1275	3954	42	301	10 457	79	876	11 755	15 709
% of Total.....	2.4	14.7	8.1	25.2		10 800		0.5	5.6	74.8	100
						68.7					

* Industrial includes 3 in perpetuity; institutional includes 6 in perpetuity; dues exempt includes 6 life members.

^b 345 of new organizational memberships were result of upgrade program.

^c 264 of personal resignations were due to upgrade program.

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ship goal set in the fall of 1968 for 1969 was exceeded in all classes with the exception of Senior Associate and Associate Memberships.

The Board of Directors, after reviewing the costs of maintaining the Student memberships, directed this program be phased out. This has been followed and the remaining 169 will be ended as of 31 May 1970.

In 1969 the upgrade program was again stressed and resulted in a total of 191 members requesting their membership be upgraded to an Organizational class. At this time, 186 of these have been completed. Gains and losses in the various classes of memberships are shown in the accompanying table.

50-Year Members

In 1970 there are six individuals and 27 organizations who have been members of the Society continuously for 50 years:

Ray B. Crepps
Joseph V. Emmons
L. J. Markwardt
Norman L. Mochel
Gershon L. Oliensis
Stanton Walker
Amerace-Esna Corp.
American Bridge Div., U. S. Steel Corp.
California State Office of Arch & Const.
Chase Brass & Copper Co., Inc.
Connecticut Dept. of Transportation, Bureau of
Highways, Res. & Mat. Test. Lab.
Consolidated Edison Co. of New York, Inc.
Cook Paint & Varnish Co.
Drexel University

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General Steel Industries Inc., Castings Division
Idaho State Department of Hwys.
Louisville Cement Co.
Mansfield Tire & Rubber Co.
Minnesota Department of Hwys.
Mississippi State Hwy. Dept.
Moore, Benjamin & Co.
National Castings Div., Midland Ross Corp.
New Hampshire Department of Public Works & Hwys.
New York City Department of Purchase
Olin Corp., Brass Div.
City of Omaha Public Works Department
The Richardson Co.
Riverton Lime & Stone Co., Inc.
Saskatchewan University Murray Memorial Library
Sun Shipbuilding & Dry Dock Co.
University of Sydney, Fisher Library
Commonwealth of Virginia Department of Highways
West Virginia State Road Commission

25-Year Members

There are 54 Personal Members who have completed 25 years of membership:

Frank M. Biffen
Samuel A. Bloom
W. A. Bradley
Edwin R. Broden
Robert J. Brown
Austin Bryant
Robert A. Burmeister
Faro Raul Cano
William M. Cline, Jr.
Joseph J. Cordiano
Anselm De Ghetto
Eric Eichwald
Robert M. Elliott
Joseph Gentile
George E. Grone-
meyer
Theodore J. Gross
Herbert F. Hagelston
Waldemar C. Hansen
Charles A. Hemenway
Charles M. Hewett
Moses D. Heyman
Kazuo B. Hirashima
Philip M. Hubbard
Dean S. Hubbell
Robert R. Kaufman
Albert L. Kaye
Joseph F. Knasiewicz

Edward W. Kuenzi
Joseph A. Liska
Ernst Loebell
Willett C. Magruder
Guy V. Martin
Warren H. Mayo
H. Migel
Stephen A. Montanaro
John A. Munyak
Nathan M. Newmark
Dat Quon Pang
Henry Philleo
Donald Price
Charles Rascher
Frank W. Reinhart
Stanley C. Reynolds
Fritz S. Rostler
Bruno Sachs
Frank H. Saniter
Arnold H. Scott
Henry L. Shuldener
Clarence A. Siebert
Chester P. Siess
George F. Stradar
M. L. Taylor
Harold A. Vicker
J. P. Welsch

Honors, Awards, and Lectures

The Society and its technical committees presented a number of awards for outstanding achievement or excellence of technical literature during the past year. Descriptions of awards and personnel of Society awards committees are given in the *Yearbook*. Names of award recipients as well as Society lecturers during the past year follow.

Honorary Membership

Elected by the ASTM Board of Directors to Honorary Membership in 1970 were:

Roman F. Geller (retired), National Bureau of Standards, Washington, D. C.
Nikolaus Ludwig, managing director, German Standards Assn. (Germany)
Willis S. MacLeod (retired), General Services Administration, Washington, D. C.
Lawrence A. O'Leary, manager, Latex Division, General Laboratory, Fuller-O'Brien Corp., South San Francisco, Calif.
Arthur G. Scroggie (retired), E. I. du Pont de Nemours and Co., Inc., Wilmington, Delaware

ASTM Award to Executives

The Award to Executives, honoring an executive who, through his outstanding interest

and support, has furthered the accomplishments of ASTM, was presented to Howard O. McMahon, president, Arthur D. Little Inc.

ASTM Award of Merit

The recipients of the Award of Merit in 1970, for distinguished service to the Society were:

William H. Ailor, Jr.
C. Walter Beattie
Charles H. Beiger
William F. Brown, Jr.
Donald M. Burmister
Edward W. S. Calkins
John R. Cardwell
Edward B. Curdts
Andrew W. Danko
J. Ivan Davison
John B. DeCoste
Russell P. Destito
Robert L. Ethington
Romas F. Geller
W. H. Goetz
Paul D. Gorsuch
Herbert F. Hardrath
Roger H. Higgons
Arthur F. Jones
Wescott C. Kenyon
Paul Klieger
John R. LeCron

Gustav C. Maassen
Robert W. McKinley
Robert E. Michaelis, Jr.
John C. Moore
Howard H. Newlon, Jr.
Robert G. Redelfs
James K. Rice
David N. Rickles
Henry E. Robinson
Eugene T. Scafe
Jerome B. Schapiro
Willard G. Snyder
Douglas R. Tate
Paul Van Gieson
Charles R. Velzy
William S. Weaver
Chester M. White
Eldridge A. White-
hurst

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Recognition of Technical Papers

Richard L. Templin Award (testing)—John J. DeLuccia and Leonard Nanis, Johnsville Naval Air Development Center, Warminster, Pa., and University of Pennsylvania, Philadelphia, Pa., for their paper, "Effects of Hydrostatic Pressures on Electrolytic Hydrogen in Iron."

Sanford E. Thompson Award (concrete)—sponsored by Committee C-9 on Concrete and Concrete Aggregates—Zvonimir T. Jugovic and James L. Gillam, Research Laboratories of Universal Atlas Cement, Div. of U. S. Steel Corp., Gary, Ind., for their paper, "Early Hydration Reactions of Abnormal Setting Portland Cement."

C. A. Hogentogler Award (soils)—sponsored by Committee D-18 on Soil and Rock for Engineering Purposes—Raymond J. Krizek and Arley G. Franklin, Department of Civil Engineering, The Technological Institute, Northwestern University, Evanston, Ill., for their paper, "Vibration Effects of Earthquakes on Soils and Foundations."

Recognition of Outstanding Contributions

Walter C. Voss Award (building technology)—Robert F. Legget (retired), Director of the Division of Building Research of the National Research Council of Canada.

Max Hecht Award (water)—sponsored by Committee D-19 on Water—Earl E. Coulter, Design Technology Section, Babcock & Wilcox Company, Barberton, Ohio.

Harold DeWitt Smith Memorial Award (textiles)—sponsored by Committee D-13 on Textile Materials—Kenneth LaDoyt Hertel, University of Tennessee, Knoxville, Tenn.

Adhesives Award (science of adhesion or technology of adhesives)—sponsored by Committee D-14 on Adhesives—Henry L. Lee, Jr., The Epoxylite Corp., South El Monte, Calif.

Lundell-Bright Memorial Award (chemical analysis of metals)—sponsored by Commit-

tee E-3 on Chemical Analysis of Metals—Silve Kallmann, Ledoux & Co., Teaneck, N. J.

H. V. Churchill Award (spectrochemical analysis)—sponsored by Committee E-2 on Emission Spectroscopy—Morris Slavin (retired), Brookhaven National Laboratory.

L. J. Markwardt Award (wood)—Frank J. Hanrahan, American Institute of Timber Construction, Washington, D. C.

ASTM-SES Awards

ASTM and the Standards Engineers Society have established two joint awards to recognize work done by standards engineers in promoting the use of standards. The 1969 award for an outstanding publication in this field went to Dr. Allen V. Astin, National Bureau of Standards, Washington, D. C. The 1969 Meritorious Service Award was given to Dr. A. Allan Bates and Mr. H. Baron Whitaker, National Bureau of Standards and Underwriters' Laboratories, Inc., respectively.

Lectures

The 1970 Edgar Marburg Lecture on "Portland Cement Concrete—Research, Testing, and Performance" was given by Bryant Mather, Chief, Concrete Division, U. S. Army Engineers, Waterways Experiment Station, Jackson, Miss.

The 1970 H. W. Gillett Memorial Lecture on "Observations and Thoughts on Stress-Corrosion Mechanisms" was presented by Norman A. Nielsen, research fellow, Engineering Materials Laboratory, Engineering Dept., E. I. du Pont de Nemours and Co., Inc., Wilmington, Del.

The first Distinguished Lecture on Outstanding Research was presented by Robert F. Rushmer, M.D., director, Bioengineering Program, and Professor of Bioengineering, College of Engineering, University of Washington (Seattle). He spoke on "Biomaterials: An Essential Ingredient for Bioengineering."

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Finances

Statement of Operations

Continued growth in the Society's general operations resulted in new highs in 1969 for both income and expense. The Board is pleased to report that the net income of the General Fund for the year ended 31 December 1969 was \$280,703, \$278,035 from operations and \$2,667 from the gain on sale of investments. Net operating income exceeded the budgeted amount by \$77,785.

With the advice and help of the Finance Committee and through the efforts of several staff planning groups the financial operations continued to improve. Net income in 1969 was \$133,984 (92.5 percent) more than 1968 net income. The swing over a two-year period from an operating loss of \$135,917 to a gain of \$278,035 was \$413,952.

Controllable items of Society expense were kept in hand with careful attention to details all across the board. Monthly reporting of departmental operations costs have proved effective in enabling management to make adjustments as they were needed in most cases.

Income

Total operating income was 8.5 percent greater than in 1968, 3.2 percent greater than the budget figure adopted in September of 1968. Dues income was 7.0 percent greater than in 1968, publications income 8.8 percent greater, and miscellaneous income 9.8 percent greater.

Expense

Total operating expense was 4.8 percent greater than 1968, 1.1 percent over budget estimates. A reduction of 15.3 percent in administrative expense below 1968 resulted largely from the elimination of a subcontract program for reference data which was terminated, and by reductions in technical committee costs which were added to Society office expense when the secretarial work for several committees was transferred to staff. Society office expense increased 14.1 percent, building occupancy expense less than 0.4 percent, and publications costs were reduced 3.6 percent.

The accompanying table gives the highlights of operations when compared with the 1969 budget.

	Actual	Budget Sept. 1968	Over(Under) Budget	Actual % of Budget
Income:				
Membership dues.....	\$ 788 721	\$ 780 000	\$ 8 721	101.1
Publication sales.....	2 493 563	2 473 000	20 563	100.8
Miscellaneous.....	424 423	338 800	85 623	125.3
	<u>\$3 706 707</u>	<u>\$3 591 800</u>	<u>\$114 907</u>	<u>103.2</u>
Expenses:				
Administrative.....	\$ 169 785	\$ 179 250	\$ (9 465)	(94.7)
Society office.....	1 873 603	1 826 100	47 503	102.6
Building occupancy.....	194 061	209 100	(15 039)	(92.8)
Publication costs.....	1 191 223	1 177 100	14 123	101.2
	<u>\$3 428 671</u>	<u>\$3 391 550</u>	<u>\$ 37 122</u>	<u>101.1</u>
Operating income.....	<u>\$ 278 035</u>	<u>\$ 200 250</u>		
Gain on sale of investments.....	\$ 2 667	...		
Net income.....	<u>\$ 280 703</u>	<u>\$ 200 250</u>		

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Investment Funds

The Society has completed its first full year of handling investments in three funds with different objectives:

Fund A—growth with modest interest—used by the General Fund and Joint Committee on Powder Diffraction Standards,

Fund B—income (not less than 4½ percent) with modest growth—Research Fund and the Medal and Lecture Funds,

Fund C—income (not less than 4½ percent) with liquidity and safety—technical committees and districts.

At 31 December the total book value of *Investment Fund A* was \$765,059 and the market value \$809,483.

Gain on sale of securities was \$3,417 which was reinvested. Interest and dividends also reinvested amounted to \$23,472. During the year the General Fund invested \$28,730 and the Joint Committee on Powder Diffraction Standards \$109,670 for a total of \$138,400.

The investment funds are now on a share basis and the value of a share declined from \$96.69 to \$91.93, only 4.93 percent as compared to a decline in the Standard and Poor average of 11.44 percent. Estimated yield declined from 3.91 to 3.65 percent. This fund is aimed toward growth.

At 31 December the total book value of *Investment Fund B* was \$260,017 and the market value \$231,437.

The estimated annual yield increased from 3.91 percent in 1968 to 6.37 percent in 1969. The value of a share dropped 18.44 percent from \$96.69 to \$78.82 due largely to the decline in the market. Income distributed to the participants in Fund B totalled \$11,706. Gain on sale was \$92. During the year a total of \$56,898 additional was invested.

At 31 December the total book value of *Investment Fund C* was \$197,367 and the market value \$179,157.

Gain on sale was \$156. The estimated annual yield increased from 3.91 percent in 1968 to 7.04 percent in 1969. The value of a share dropped from \$96.69 to \$85.13 (11.96 percent) which was about the same as the change in Standard and Poor's average. Income distributed to participants amounted to \$11,548. There were no additions to Fund C.

Cash Management

Cash receipts from dues and book of standards sales early in the year which are not needed until later have been invested in commercial short term notes at interest ranging from 6½ percent to 9 percent. At year end the Society held \$600,000 worth. The high rates of interest during 1969 were to the Society's advantage.

Property Fund

The Property Fund, which includes the former Building Fund, the furniture and equipment, and the automobile, has assets of \$2,751,029 at 31 December 1969. Against this there is a total indebtedness of \$592,846 divided as follows:

Mortgage, Western Savings Fund Society, 5¼%	\$442,846
Loan from Jt. Committee on Powder Diffraction Standards, 4%	\$150,000

Contributions to the Building Fund are still accepted but not actively solicited. A few contributions were received this year.

Joint Committee Funds

Although the funds of the Joint Committee on Powder Diffraction Standards have been separated from the General Fund since 1 December 1965, they continue to be shown on the balance sheet in the auditors report under special and custodian funds. The Society has always served as fiscal and business agent for the Committee. A separate financial statement has also been prepared for the Joint Committee by the auditors.

As of 1 April 1970 the Joint Committee is establishing its own office in other quarters and the Society's responsibilities as fiscal and business agent will be phased out.

Balance Sheet

The balance sheet included in the annual report of the auditors as of 31 December 1969 showed assets in the General Fund of \$1,617,767, up from \$1,313,542 in 1968.

Surplus and surplus reserve rose to \$726,245 from \$446,596 in 1968.

1970 Budget

In September 1969 the Board adopted a

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SUMMARY OF INCOME AND EXPENSE, 1965-1969

	1965	Percent	1966	Percent	1967	Percent	1968	Percent	1969	Percent
Operating Income										
Dues.....	\$ 458 023 ^a	18.3	\$ 686 971	23.5	\$ 712 823	23.9	\$ 737 098	21.6	\$ 788 721	21.3
Sales of publications.....	1 721 214	68.7	1 852 947	63.5	1 902 969	63.9	2 292 280	67.1	2 493 563	67.3
Miscellaneous.....	327 381	13.0	379 991	13.0	364 406	12.2	386 416	11.3	424 423	11.4
Total income.....	\$2 506 618	100.0	\$2 919 909	100.0	\$2 980 198	100.0	\$3 415 795	100.0	\$3 706 707	100.0
Operating Expense										
Administrative expense....	\$ 163 454	6.1	\$ 205 329	7.5	\$ 196 488	6.3	\$ 200 375	6.1	\$ 169 785	5.0
Cost of publication sales..	1 015 842	37.7	942 300	34.4	1 148 027	36.8	1 235 793	37.8	1 191 223	34.7
Society office expense:										
Salaries.....	871 385	32.4	900 414	32.9	999 480	32.1	1 076 866	32.9	1 169 085	34.1
Other office expense.....	431 472	16.0	488 487	17.8	575 416	18.5	565 367	17.3	704 518	20.5
Building occupancy ex-										
pense.....	209 816	7.8	204 033	7.4	196 704	6.3	193 343	5.9	194 061	5.7
Total expense.....	\$2 691 969	100.0	\$2 740 563	100.0	\$3 116 115	100.0	\$3 271 744	100.0	\$3 428 671	100.0
Favorable operating bal-										
ance.....			\$ 179 346				\$ 144 051		\$ 278 035	
Operating deficit.....	(\$ 185 351)				(\$ 135 917)					

^a Includes entrance fees.

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proposed budget for 1970 which estimated net operating income of \$201,000. This is in line with the Board directive that the Society should include in its budget a surplus of at least \$200,000 annually.

In line with the new practice of greater flexibility of control in Society finances, the budget was prepared on a quarterly basis and will be reviewed periodically with the chairman of the Finance Committee.

BUDGET SUMMARY FOR FISCAL 1970

(1 January to 31 December 1970)

	Operating Income	Percent
Dues.....	\$ 850 000	21.1
Publications.....	2 759 000	68.4
Miscellaneous.....	422 000	10.5
Total operating income.....	\$4 031 000	100.0
	Operating Expense	Percent
Administrative.....	\$ 176 500	4.6
Publication expense and cost of sales (outside costs).....	1 298 600	33.9
Society office expense:		
Salaries.....	1 368 400	35.7
Other.....	763 000	19.9
Building occupancy expense.....	223 500	5.9
Total operating expense.....	\$3 830 000	100.0
Anticipated net operating income.....	\$ 201 000	

Cooperative Activities

American National Standards Institute

In the fall of 1966, the American Standards Association began a complete reorganization under the name of United States of America Standards Institute (USASI). Under growing pressures that the new name implied a government operation, steps were taken by the Institute to change it; and, effective 6 October 1969, USASI became the American National Standards Institute, Inc. (ANSI). At the same time, the designation of its standards changed from USA Standards to American National Standards. Concurrent with these changes was a move of the Institute's headquarters to a new location in New York City.

The preparation of new operating procedures for ANSI and the initiation of a Board of Standards Review were other accomplishments during the past year. The ASTM managing director made important

contributions to the development of the new procedures as a member of several of the Institute's committees. In addition, the Society participates on the ANSI Metric Advisory Committee, the Advisory Committee on International Standards and Programs, and the Building Code Standards Advisory Committee.

The Society continues to follow its regular procedure of submitting ASTM Standards to ANSI for approval as American National Standards so that by the spring of 1970, 1865 of the 3915 ASTM Standards had been submitted and approved. This represents almost 47 percent of the approximately 4000 American National Standards.

New Organizations

In a move to separate the standards activities of Committee E-14 on Mass Spectrometry from the operation of the Annual

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Meeting on Mass Spectrometry, articles of incorporation for the American Society for Mass Spectrometry were approved by the courts of Pennsylvania in the summer of 1969. ASMS is concerned with the conduct of the annual meeting while the standards activities in this field remain the responsibility of ASTM.

Since 1941, ASTM has been a sponsor of the Joint Committee on Powder Diffraction Standards with the American Crystallographic Association, the (British) Institute of Physics, and the National Association of Corrosion Engineers and has handled the Joint Committee's finances. In recent years, ASTM has also provided housing for the Joint Committee operations and personnel. Because the Joint Committee plans to expand beyond the capacity of space available at ASTM headquarters, and ASTM's own growing needs, the parties involved agreed that the Joint Committee should incorporate as a separate entity and, on advice of the Internal Revenue Service, apply for its own tax-exempt status.

In February of 1970 the Joint Committee on Powder Diffraction Standards was incorporated in the Commonwealth of Pennsylvania and moved in April to new quarters at 1845 Walnut St., Philadelphia.

ASTM continues cooperation with a number of societies through contributions and memberships which are reviewed annually by the Board of Directors. One of the newest is the Alliance for Engineering in Medicine and Biology, organized 21 July 1969. The goal of AEMB is to improve the quality and distribution of health care through the earlier introduction and more enlightened use of advanced technology in life-science research and clinical practice. ASTM Committee F-4 on Surgical Implants will provide the principal Society liaison with the new group.

The American Society of Civil Engineers, American Institute of Architects, and the American Concrete Institute announced the establishment of a National Board of Accreditation for Concrete Construction (NBACC) to encourage quality in concrete construction, particularly through accreditation of the construction contractors, suppliers of concrete and other physical elements entering into concrete construction, and operators of testing laboratories inspecting and testing concrete or testing other components

of concrete construction. ASTM is concerned with the development of standards for measuring the effectiveness of testing laboratories through its Special Committee on Materials Inspection and Testing Laboratories and, therefore, asked for participation on a full partnership basis. As a result, NBACC decided to ask interested organizations to name representatives to an Advisory Council of the NBACC to participate actively in the development of criteria for accreditation of contractors, suppliers, testing laboratories, and others having a part in the production of quality concrete. The Society has accepted this invitation, naming the chairman of the above-mentioned special committee and the manager of the Cement and Concrete Reference Laboratory as the Society representatives.

Unified Numbering System for Metals and Alloys

ASTM and the Society of Automotive Engineers (SAE) have begun a joint study to determine the feasibility of a unified numbering system for all metals and alloys. The object of the one-year study is to provide a single system of metal identification which can be used by all major standards- and specifications-issuing organizations in the USA. The study will be conducted by a six-man team with three members from each society, representing the military, and the metal producing, automotive, aircraft, and electrical industries.

Joint Symposia

The Society lent its support to the American Society for Metals in the 1969 Materials Exposition and Congress held at Civic Center, Philadelphia, 13-16 October. Four of the Congress symposia were sponsored by ASTM committees: Applications of Modern Metallographic Techniques (Committee E-4 on Metallography), Corrosion Testing—Science or Fiction (Committee G-1 on Corrosion of Metals), Rapid Methods for the Identification of Metals (Committee E-3 on Chemical Analysis of Metals), and Engineering Properties of Ceramic-Metal Systems (Committee C-22 on Porcelain Enamel and Related Ceramic-Metal Systems).

International

The managing director attended the COPANT (Pan American Standards Com-

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mission) meetings in Mexico City in mid-February 1970.

The Society was host to a meeting of Working Group 1 of ISO/TC 17 on Steel at ASTM Headquarters in September 1969 and received a number of international visitors in small groups of industrial teams or singly throughout the year.

Engineers Joint Council, the group responsible for USA representation in UPADI (the Pan American Federation of Engineering Societies), has announced plans to reorganize USA participation by forming a U. S. National Committee for UPADI. Details, including finances and the status of non-members of EJC, are still to be worked out.

A symposium sponsored by the Metals Property Council, Engineers Joint Council, and ASTM aimed at defining problems and offering possible solutions in the evaluation and presentation of data on the mechanical properties of structural materials in response to the needs of design engineers was held at ASTM headquarters on 5 November 1969. The following topics were covered: "Translation of Material Properties into Useful Design Information for the Construction In-

dustry," "Characterization Requirements for Polymeric Materials in Appliance Applications," "The Essential Role of Materials Characterization," "Availability of Properties and Meaning of Design Data in the Metals Field," and "Nonmetallic Materials." Following the presentation of these formal topics, a panel discussion was held.

National Bureau of Standards

Of special interest are two ASTM committee projects which will involve the National Bureau of Standards. First, Committee E-6 on Performance of Building Constructions will establish a new research fellowship at the Bureau in connection with the committee's three-year program to develop test methods, performance standards and prototype apparatus for evaluating long-term durability of factory fabricated insulating glass units. Second, Committee D-22 on Sampling and Analysis of Atmospheres will also sponsor a research fellowship at the Bureau in connection with their project on ambient air sampling and analysis. Further details will be found in another section of this report.

Administrative Matters

Washington Office

1969 was the first full year of operation of our Washington Office. It should be emphasized that John C. Green, who is ASTM's Washington representative, made exceedingly valuable contributions, not only in those areas normally associated with the term "Washington Office" but as a spokesman for ASTM in matters only vaguely related to government activities *per se*. For example, communications with Mr. Green were the beginning of a series of events which have resulted in the establishment of an ASTM activity in the area of forensic sciences.

Pacific Area Office

As a result of financial necessity, the ASTM commitment in the Pacific area was reduced in 1969 through the elimination of the actual office and reduction in personnel. F. L. Scovill, Jr., continued, working in a more informal manner, to provide the serv-

ices required. There is no evidence to indicate that these administrative changes, which resulted in substantial savings in expenditures to the Society, have in any way reduced the utility and usefulness of our Pacific Area representative.

Staff Organization

During 1969 the implementation of staff augmentation to support the emerging administrative needs discussed in "ASTM in the 70's" was begun substantially. The administrative staff in Technical Operations was strengthened through the development of a new job classification entitled Staff Assistant. Two Staff Assistants were appointed. The first full year of the operation of the office of Associate Director proved the validity of that concept and has resulted in greatly increased clerical and administrative efficiency and has accelerated the Society's program of modernizing its record-keeping,

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standards-processing, and information dissemination systems.

Beginning in early fall, 1969, administrative planning was initiated by the staff to support the various changes involved in the membership restructuring to take effect in 1971. This involved a projection of administrative requirements, with appropriate integration, through the year 1971. Among other things, it involved replanning our electronic data processing activities, our membership records and services activities, our reproduction process activities and other internal staff support functions. The year ended with planning reasonably complete for the necessary changes. The staff planning function continues as a principal responsibility of the deputy managing director.

Plans were completed in 1969 for the redesign and modernization of the *Annual Book of ASTM Standards*. It is anticipated that the conversion to more modern methods

of printing will be completed in 1972. Further details on this adjustment are reviewed in another section of this report.

Staff Benefits

During the year, the standing committee responsible for the administration of the staff pension plan was reorganized and redesignated the Staff Benefits Committee. This reflected their increased responsibility, which includes not only the administration of the pension plan but the continuing surveillance of employee benefits as compared with those of similar organizations.

Respectfully submitted on behalf of the Board of Directors,

L. S. CRANE,
President

W. T. CAVANAUGH,
Managing Director
June 1970

BYLAWS

MARCH 31, 1970

ARTICLE I. MEMBERS AND THEIR ELECTION

SEC. 1. The corporate membership of the Society, hereinafter called members of the Corporation, shall consist of Members, Sustaining Members, Senior Members, and Honorary Members. In addition, there shall be Affiliates. The rights of membership of organizations holding membership shall be exercised only by the individual who is designated as the official representative of that membership.

SEC. 2. A Member shall be: (1) an individual subscribing to the purposes of the Society and holding participating membership on one or more technical committees or subcommittees of the Society; (2) an individual subscribing to the purposes of the Society but not participating as a member of a technical committee or subcommittee; (3) an educational institution; public library; or a scientific, engineering, or technical non-profit society subscribing to the purposes of the Society.

SEC. 3. A Sustaining Member shall be an individual, a business, governmental, re-

search, or professional organization, or trade association or separate facility thereof subscribing to the purposes of the Society.

SEC. 4. An Affiliate shall be an individual who is invited by a committee and/or subcommittee, subject to approval by the Board of Directors, to participate on a committee or subcommittee of the Society because of his special knowledge either as a professionally and/or technically qualified individual, or as an ultimate consumer.

SEC. 5. A Senior Member shall be an individual who is fully retired from his regular employment, who has been a member of the Society and/or a participant in an activity of the Society for a total of ten years or more, not necessarily continuously, and who elects to continue his association with the Society through the payment of reduced dues. He shall have the same rights and privileges as a Member except as may be limited by the Board of Directors for this classification.

SEC. 6. An Honorary Member shall be an individual of widely recognized eminence in

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some part of the field which the Society aims to cover as defined in Sec. 2 of the Charter, or one who has rendered especially meritorious service to the Society. An Honorary Member shall have the same rights and privileges as a Member. The number of Honorary Members shall be left to the discretion of the Board of Directors. Nominees for Honorary Membership may be proposed in writing to the Board of Directors by any member of the Society. Election of Honorary Members shall be by the Board of Directors by unanimous action of the members present in session and voting; or by the Executive Committee by unanimous action of the members present in session and voting, ratified with no negative votes by a letter ballot of the full Board of Directors.

SEC. 7. Applications for membership in the Society shall be submitted to the Managing Director. Election to membership will become effective upon payment of dues. Nomination of individuals to become Affiliates will be made to the Board of Directors by appropriate committees.

SEC. 8. Resignations from membership shall be transmitted in writing to the Managing Director.

ARTICLE II. BOARD OF DIRECTORS, COMPOSITION, RESPONSIBILITIES

SEC. 1. The management of the Society shall be vested in a Board of Directors consisting of the President; two Vice-Presidents; eighteen Directors; the last two Past-Presidents; the Chairman of the Finance Committee, ex-officio; and the Managing Director, ex-officio without vote.

SEC. 2. The officers of the Society shall be a President, two Vice-Presidents, eighteen Directors, a Managing Director who shall also serve as Secretary, and a Chairman of the Finance Committee who shall also serve as Treasurer.

SEC. 3. The officers—with the exception of the Managing Director and Chairman of the Finance Committee—shall be elected by letter ballot of the Society from among the eligible members of the Corporation. The letter ballot shall close at noon on the day preceding the opening of the annual meeting of the Society, and the result of the ballot shall be announced during the annual meet-

ing. The terms of office shall begin at the close of the annual meeting.

SEC. 4. The President shall hold office for one year. The Vice-Presidents shall hold office for two years; the term of office of one Vice-President shall expire in the even years and that of one Vice-President in the odd years. The Directors shall hold office for three years and shall be so elected that the terms of office of six Directors expire each year.

SEC. 5. The Board of Directors shall appoint a Managing Director and a Chairman of the Finance Committee both of whom shall serve at the pleasure of the Board. The Managing Director shall also serve as Secretary of the Society and shall be its chief administrative officer. The Chairman of the Finance Committee shall also serve as Treasurer of the Society.

SEC. 6. The Board of Directors may designate assistant secretaries and assistant treasurers from among the administrative personnel of the Society to serve in the place and stead of the Managing Director and the Chairman of the Finance Committee when appropriate.

SEC. 7. The President, the Vice-Presidents and the Directors shall be ineligible for reelection to the same office until at least one term shall have elapsed after the end of their respective terms.

SEC. 8. The officers shall serve for their respective terms to which they shall have been elected.

SEC. 9. The Board of Directors shall have the power to fill vacancies occurring in its number by death, resignation or otherwise, except that in filling the office of the President appointment shall be made from one of the currently elected members of the Board.

SEC. 10. The Board of Directors shall hold three regular meetings during the year. The time and place at which such meetings shall be held shall be fixed by the Board of Directors. Special meetings of the Board of Directors shall be held at the direction of the President, or upon request in writing to the President of seven or more members of the Board of Directors.

Nine members of the Board of Directors shall constitute a quorum.

SEC. 11. Each person (his heirs, executors, and administrators) shall be indemnified

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by the Society against expenses reasonably incurred by him in connection with any action, suit, or proceeding to which he may be made a party by reason of his serving or having served as a member of the Board of Directors, or a committee, or an officer, or employee of the Society, or of another corporation or organization with which he may serve or have served as such or as a trustee, at the request of the Society or by reason of his otherwise serving or having served as a nominee of the Society, except in relation to matters to which he shall be finally adjudged in such action, suit, or proceeding to be liable for negligence or misconduct in the performance of his duties. Such expenses shall include the cost of reasonable settlement made with a view to curtailment of litigation. The foregoing right of indemnification shall not be exclusive of other rights to which he may be entitled as a matter of law.

SEC. 12. The Board of Directors shall appoint from among its members an Executive Committee to be composed of not more than seven members. When the Board of Directors is not in session, the Executive Committee shall exercise all of the general powers of the Board of Directors except the power to fill vacancies in the Board, amend the Regulations Governing the Board of Directors, and establish standing and technical committees of the Society. The Executive Committee shall keep minutes of its proceedings which shall be promptly reported to each member of the Board of Directors for approval or disapproval.

SEC. 13. The fiscal year of the Society shall be the calendar year.

ARTICLE III. NOMINATION OF OFFICERS

SEC. 1. There shall be created annually a nominating committee consisting of the last three Past-Presidents of the Society continuing to be members and six other members appointed by the Board of Directors.

SEC. 2. Not later than July 1 of each year the Managing Director shall notify every corporate member of the Society that he has the right to recommend two members for appointment on the nominating committee. The procedure governing the transmission of such recommendations shall be designed to ensure secrecy as to individual authorship.

A committee of tellers appointed by the President shall canvass the recommendations which have been received by the Managing Director prior to August 15, and shall transmit the returns to the Managing Director in time for presentation to the Board of Directors at its first regular meeting thereafter. At the meeting the Board of Directors shall consider the recommendations of the members with due reference to the various interests in the Society, and shall then appoint six members of the nominating committee and one alternate for each of these members. Members of the Board of Directors shall be ineligible for appointment on the nominating committee. The members of the nominating committee for a given year shall not be eligible for appointment on this committee for the succeeding year. The Managing Director shall notify the members and the alternates of their appointments and of the date and place of meeting of the nominating committee. In case the Managing Director does not receive from any member of the nominating committee, within 15 days of the date of sending out notification, a statement that it is the intention of this member to attend the meeting of the nominating committee, he shall so inform the alternate of this member.

SEC. 3. The meeting of the nominating committee shall be held not later than five months prior to the annual meeting of the Society. The traveling expenses of the members of the nominating committee shall be defrayed by the Society. It shall be the duty of the nominating committee to make one nomination for each office (except that of Managing Director and Chairman of the Finance Committee) for which the term will expire at the time of the next annual meeting. Only members of the nominating committee who are in attendance at the meeting may participate in the work of the committee, but an alternate who is present may take the place of the member he is appointed to represent.

SEC. 4. The Managing Director shall notify each nominee of his nomination. In case a nomination is declined or in case the person nominated is ineligible, the Board of Directors shall fill the vacant place in the list of nominations. The nominations shall be announced to the members through a notice

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in an issue of the Society's official monthly periodical mailed not later than ten weeks prior to the annual meeting.

SEC. 5. Further nominations, signed by at least 25 members, may be submitted to the Managing Director in writing not later than seven weeks prior to the annual meeting, and a nomination so made, if accepted by the member nominated, shall be placed on the official ballot.

SEC. 6. An official ballot shall be issued to the members of the Corporation not later than four weeks prior to the annual meeting, which ballot shall contain names of candidates nominated in accordance with the provisions of this Article. The method of voting shall be by secret ballot. The voter shall have the right to substitute any name or names of eligible members of the Society for a corresponding number of names on the ballot.

SEC. 7. The dates in this Article are fixed on the assumption that the annual meeting will be held between the middle of June and the middle of July. If this meeting should be held outside of this period, the Board of Directors shall be authorized to depart from the dates in this Article as may seem expedient, consistent with the general spirit and purpose of the provisions in this Article.

ARTICLE IV. DUTIES OF OFFICERS

SEC. 1. The President shall preside at all meetings of the Society and of the Board of Directors. He may appoint any other officer or member of the Society to preside at any designated session of a meeting of the Society. He shall be a member ex-officio of every committee of the Society.

SEC. 2. In the absence of the President his duties shall be performed by the senior Vice-President present. In the absence of the President and Vice-Presidents, the duties of the President shall be performed by a President *pro tem*, elected by the Board of Directors.

SEC. 3. The Board of Directors may, at its discretion, appoint a member or members, or other person or persons, to represent it at meetings of societies of kindred aim or at public functions. Such delegates may be designated as "Honorary Vice-President," and

their duties and title shall terminate with the occasion for which they are appointed.

SEC. 4. In the fulfillment of his duties between meetings of the Board of Directors and the Executive Committee, the Managing Director is responsible to the President.

SEC. 5. The Managing Director or his designate shall be responsible for maintaining a record of the proceedings of all meetings of the Board of Directors and the Executive Committee.

ARTICLE V. MEETINGS

SEC. 1. The Society shall meet annually, for the transaction of its business, at a time and place fixed by the Board of Directors. Twenty-five corporate members shall constitute a quorum.

SEC. 2. Special business meetings of the Society may be called at any time and place at the discretion of the Board of Directors, or shall be called by the President upon the written request of at least one per cent of the corporate membership.

The call for such a special business meeting shall be issued at least thirty days prior to the date set for it and shall state the business to be considered.

SEC. 3. Other meetings of the Society may be held at such time and place as the Board of Directors may designate.

SEC. 4. By direction of the Board of Directors in particular instances vote by proxy may be authorized.

ARTICLE VI. SOCIETY ORGANIZATION

SEC. 1. The Board of Directors shall have the power to establish and to discharge divisions, committees, and other subordinate groups.

SEC. 2. The Board shall delegate to such divisions, committees, and other groups those powers necessary for the fulfillment of their assigned functions.

ARTICLE VII. PROCEDURE GOVERNING THE ADOPTION OF STANDARDS

SEC. 1. The term "Standards" shall be applied collectively to specifications, methods, definitions, classifications, and recommended practices that have been approved by the sponsoring committee and adopted by the Society in accordance with the procedure established therefor.

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SEC. 2. The term "Tentatives" shall be applied to those specifications, methods, definitions, classifications, and recommended practices, that have been approved by the sponsoring committee and accepted by the Society in accordance with the procedure established therefor, for publication and use preliminary to adoption as Standard, thus providing opportunity for suggestion and criticism.

SEC. 3. Adoption of Standards, including new Standards, revision of Standards, adoption of Tentatives as Standards, reapproval of Standards, and withdrawal of Standards shall be by letter ballot of the Society. The procedure for this letter ballot shall be as set forth in Paragraphs (a), (b), (c), (d), (e) and (f) following:

(a) Recommendations from technical committees covering adoption of Standards may be referred to letter ballot of the Society at any time during the year by direct submittal to Society Headquarters. All recommendations will be presented to the members of the Corporation for letter ballot by means of a regular insert in *Materials Research and Standards* (issued monthly). The interval between insertions shall not exceed three months.

(b) Each member of the Corporation shall be entitled to one vote on all recommendations covering adoption of Standards, except when a tally by voting interest[†] is required. A tally by voting interest is required when the decision might be changed by such a tally. In such case, each interest represented in the Society, regardless of the number of memberships held, shall command only a single vote.

(c) A return of fifty (50) or more ballots shall be required.

(d) An affirmative vote amounting to nine tenths of the combined affirmative and negative votes cast shall be required on recommendations submitted to the Society involving immediate adoption as Standard either of a proposed new Standard or of a revision of an existing Standard.

(e) An affirmative vote amounting to two thirds of the combined affirmative and negative votes cast shall be required on recommendations submitted to the Society, involving adoption of Tentatives as Standard, with-

drawal of an existing Standard, or reapproval of a Standard.

(f) The results of the ballot, the report of the review of negative votes by the technical committee, and the original ballot of the technical committee, shall be submitted to the Committee on Standards for review on behalf of the Society. The Committee on Standards shall determine whether the requirements of the Society relating to procedure have been met, and whether a satisfactory consensus has been reached. During consideration of the recommendation of a technical committee by the Committee on Standards, representatives of the committee and other parties at interest may be present and participate in the discussion. If the Committee on Standards takes favorable action upon the recommendation, the Standard is approved for the Society effective thirty (30) days following the date of this action, and the technical committee shall report the action in its next annual report.

SEC. 4. Acceptance of Tentatives, including new Tentatives, revisions of Tentatives, tentative revisions of Standards, reversion of Standards to Tentative, and withdrawal of Tentatives shall be by action of the Committee on Standards on recommendations of technical committees. Committee recommendations may be presented at any time of the year to the Committee on Standards for action on behalf of the Society by direct submittal to Society Headquarters. The Committee on Standards shall determine whether the requirements of the Society relating to committee procedure have been met and whether the committee has reached a satisfactory consensus. During consideration of the recommendation of a technical committee, representatives of the committee and other parties at interest may be present and

[†] A voting interest shall be any of the following: (1) a company or corporation; a plant, branch, or other primary division of a company or corporation having a separate interest so far as the Standard in question is concerned; a university, school or department thereof; an association, institute, or society; a federal, state or other governmental department, agency, laboratory or other primary division having separate interest so far as the Standard in question is concerned; and including all individual members of the Society affiliated with any of the foregoing; (2) an unaffiliated individual member.

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participate in the discussion. If the Committee on Standards takes favorable action upon the recommendation, the recommendation is approved for the Society effective thirty (30) days following the date of this action, and the technical committee shall report the action in its next annual report.

SEC. 5. Reports, resolutions and recommendations pertaining to or involving the use, or proposed use, in a Standard or Tentative, of any device or process which forms the subject matter of any existing patent, copyright or trademark, shall first be submitted to the Board of Directors, and shall be submitted to the Society only with the approval of the Board of Directors.

ARTICLE VIII. DUES

SEC. 1. The membership year shall commence on the first day of January.

SEC. 2. The Board of Directors shall establish the rate of annual dues for the different categories of membership in the Society, subject to approval of the voting membership by letter ballot. A two-thirds approval of those members voting is required for ratification.

SEC. 3. A bill for the annual dues for the ensuing year shall be mailed to each member by the first day of the membership year. Notice of arrears shall be sent thereafter, as directed by the Board of Directors. The Board may order the withholding of membership rights and privileges, including the right to vote, to serve on committees, and to receive the publications of the Society, for members whose dues have remained unpaid for three (3) months. Members whose dues have remained unpaid for six (6) months shall, in the discretion of the Board of Directors, be stricken from the roll of membership and shall cease to have any further rights as members. The Board of Directors may reinstate any member dropped from the rolls.

SEC. 4. The resignation of a member whose dues for the current membership year are unpaid, shall be acceptable only if it be received within one month from the beginning of the membership year, unless an exception be authorized by special action of the Board of Directors.

SEC. 5. The Board of Directors shall offer exemption from further payment of dues to any person (a) who is a Past President retired from the Board of Directors; or (b) who has paid dues as an individual member for at least thirty-five (35) years, not necessarily continuously (Student Membership years not included), and has retired from his regular work or (c) who has paid dues as an individual member for twenty-five (25) years, not necessarily continuously (Student Membership years not included), and has reached the age of sixty-five (65) and has retired from his regular work, and the sum of whose age and years of individual paid membership equals at least ninety-five (95). He shall have the same rights and privileges as a Member, except as may be limited by the Board of Directors for this category.

SEC. 6. At its discretion, the Board of Directors may confer life membership upon any individual.

ARTICLE IX. AMENDMENTS

SEC. 1. Amendments to the Bylaws may be proposed by any person entitled to vote, provided that they shall bear the written endorsement of at least ten (10) members of the Corporation in good standing, or by the Board of Directors. The amendments, together with the recommendations of the Board of Directors thereon, shall be considered at the next regular or special business meeting of the Society. The proposed amendments shall be printed in the notice calling the meeting and issued at least thirty days prior to the date set for it. At the meeting, the proposed amendments shall be open to discussion and amendment and, if approved by a two-thirds vote of the members of the Corporation present in person or by proxy, shall be submitted to all the members of the Corporation for a vote by letter ballot.

If two thirds of the votes obtained by letter ballot are in favor of the proposed amendments, they shall be adopted.

SEC. 2. The Board of Directors is authorized to renumber the Articles and Sections of the Bylaws to correspond with any changes that may be made.

APPENDIX I

REPORT OF COMMITTEE ON STANDARDS

The Committee on Standards held three meetings during the year: on June 26, 1969, in conjunction with the ASTM Annual Meeting in Atlantic City, N. J., and on Nov. 18, 1969, and April 8-9, 1970, at Society Headquarters. The meetings were devoted almost entirely to matters that could not be handled by correspondence, such as controversial actions on standards where both proponents and opponents wished to have a hearing, and policy matters. Other matters, of which there were many, were handled by correspondence.

The following individuals comprise the present membership of the Committee on Standards:

- G. H. Harnden (chairman), (retired) General Electric Co.
- J. B. Curley, FMC Corp., American Viscose Div.
- ** F. M. Gavan, Armstrong Cork Co.
- W. J. Halstead, Bureau of Public Roads
- * D. S. Hamby, School of Textiles, North Carolina State University
- J. F. Hickerson, Humble Oil and Refining Co.
- A. F. Jones, Army Materials and Mechanics Research Center
- * R. A. Jones, Small Homes Council—Building Research Council, University of Illinois
- J. F. Kerscher, The Goodyear Tire and Rubber Co.
- J. R. LeCron, Bethlehem Steel Corp.
- * W. H. Mayo, U. S. Steel Corp.
- W. R. Pressler, Pittsburgh Testing Labs.
- R. I. Scace, General Electric Co.
- * E. I. Shobert II, Stackpole Carbon Co.
- * Morris Tanenbaum, Western Electric Co., Inc.
- H. J. Stremba, secretary, ASTM staff
- Betty J. Preston, recording secretary, ASTM staff

The Committee recorded with deep regret the death on June 20, 1969, of Robert M. Berg who had served the committee with

distinction for a number of years. A resolution was adopted in his honor.

A summary of the more important actions taken by the committee during the year relating to the activities of ASTM are discussed below.

Changes in Regulations Governing the Committee on Standards

The Regulations Governing the Committee on Standards are being revised to expedite the reporting to the Committee of actions on standards taken by the technical committees and to alleviate some of the paper work. Tied in with the revised Regulations is the development of a revised report form.

ASTM Standardization Procedures

(1) *Emergency Procedure*—A task group has been appointed to study the Society's Emergency Procedure and to make recommendations regarding its use today in areas where standards must be provided more quickly than can be done under the Regulations for Standards and Tentatives. Areas proposed for its use are standards for "Operation Breakthrough," the Government experiment in mass produced housing, consumer products, air and water pollution, and forensic science.

The Emergency Procedure was developed during World War II for use in a national emergency and provides for publication of Emergency Standards and Emergency Alternates based on subcommittee or task group approval, subject to approval by the chair-

* Ex-officio member from Board of Directors.

** Ex-officio member from Standing Committee on Technical Committee Operations.

REPORT OF COMMITTEE ON STANDARDS

man of the main technical committee and the Committee on Standards.

(2) *Procedure for Standards and Tentatives*—The procedure for the development of ASTM Standards and Tentatives has been questioned with regard to the length of time now required to produce a Society-approved document. A task group has been appointed to study the entire procedure from development within the technical committee through approval by the Society and the Committee on Standards. The objective is to attempt to shorten this procedure and thus speed up the standardization process, but at the same time maintain the consensus principle.

Society's Standardization Coverage

The task group referred to above in (2) will also address itself to the broad question of whether ASTM is covering adequately the development of standards in all areas of our concern, and it will examine the role of the Committee on Standards in promoting the Society's standardization work.

Improving ASTM Specifications

The question of how the technical committees can make ASTM specifications more useful to the producer and consumer in every day commercial transactions and in the event of legal involvement has been explored by a task group of the Committee on Standards. The conclusions of the task group, which have been endorsed by the Committee on Standards, are to urge technical committees to review all specifications under their jurisdiction to: (1) eliminate where possible open-end agreements which are those statements that allow agreement between the buyer and seller to lower the minimum requirements of the specifications; (2) use the existing "standard" certification clauses in problem areas; (3) determine whether marking and stamping clauses include as much detailed information as is practicable; (4) review size ranges in specifications to eliminate problem areas; and (5) provide in the specifications the special requirements needed for Boiler and Pressure Vessel Code purposes.

Board Policy on Fire Tests

In 1951 the Board of Directors adopted a policy which delineated the responsibilities

of the materials committees and Committee E-5 in developing standards for fire tests. The Committee on Standards has appointed a task group to review this policy in light of subsequent developments and to make recommendations for changes.

Editorial Changes in ASTM Standards

The policy dealing with editorial changes in standards has been revised to provide more assistance to the technical committees and staff in identifying and dealing with editorial changes.

Disputes in Technical Committees Delay Standards

Disputes between opposing economic interests have been instrumental recently in delaying the development of standards in several areas. A task group has been appointed by the Committee on Standards to work with staff on a survey of the history of developments looking toward developing appropriate operating mechanisms to aid committees in avoiding these disputes.

Review of Negative Votes Cast on Society Ballots

Section 8.8 of the Regulations Governing Technical Committees has been revised jointly by the Committee on Technical Committee Operations and the Committee on Standards to provide more detailed guidance to the technical committees in dealing with negative votes cast on the Society ballot. The revision is subject to review by the technical committees and approval by the Board.

Actions on Standards and Tentatives (1077 Actions)

Actions by the Society at the 1969 Annual Meeting—The Committee on Standards took cognizance of the 251 recommendations affecting standards and tentatives accepted by the Society at the 1969 Annual Meeting. The various actions reported are:

New standards	11
Revisions of standards	61
Tentatives adopted as standard	75
New tentatives	23
Tentatives revised	9
Standards and tentatives withdrawn	9
Standards reapproved	63

REPORT OF COMMITTEE ON STANDARDS

Actions on Tentatives by the Committee on Standards—During the year technical committees submitted a total of 64 proposals relating to tentatives for review and action by the Committee on Standards as follows. The details of these recommendations have been reported in *Materials Research and Standards*:

New tentatives	49
Revisions of tentatives	9
Tentative revisions of standards	1
Tentatives withdrawn	4
Standards reverted to tentative	1

Actions on Standards Under the Interim Procedure—During the year technical committees submitted a total of 762 proposals for Society action under the Interim Procedure on recommendations relating to Standards as follows. Under the Interim Procedure the Committee on Standards is responsible for reviewing the results of the technical committee and Society votes to determine whether the requirements of the Society relating to procedure have been met and whether a consensus has been reached:

New standards	94
Revisions of standards	304
Tentatives adopted as standard	99
Standards withdrawn	9
Standards reapproved	256

Relations with American National Standards Institute (450 Submittals)

Standards Submitted Under the Existing Standards Method—During the year 210 ASTM Standards have been submitted to ANSI for approval as American National Standard under the Existing Standards Procedure.

Revised Standards Submitted Under the Proprietary Procedure—As proprietary sponsor for the revision of ASTM Standards that have been approved as American National Standard under the Existing Standards Procedure, the Society has submitted to ANSI during the year revisions of 117 Standards.

Standards Submitted Under the American National Standards Committee Procedure—Three American National Standards Committees for which ASTM is sponsor or joint sponsor presented 123 recommendations to ANSI during the year.

Respectfully submitted on behalf of the committee,

G. H. HARNDEN,
Chairman

H. J. STREMB, .
Secretary
BETTY J. PRESTON,
Recording Secretary

APPENDIX II

REPORT OF COMMITTEE ON PUBLICATIONS

Two meetings of the Committee on Publications were held during the Society year: 4 June 1969 and 25 November 1969.

New members appointed to the committee are: C. E. Feltner, J. W. Guinee, J. V. Mullin, and S. G. Weissberg. J. J. Heger and J. D. McClelland were reappointed to serve a three-year term.

As of January 1970, R. W. Bletzacker was appointed acting chairman until Chairman J. C. Grosskreutz returns from Germany in the fall of 1970.

Review of ASTM Publications

The extent of the Society's publications during the year is presented in the accompanying Record of Publications.

Work Accomplished and in Process

A great deal has been accomplished during the past year through the vigorous and dedicated work of the committee. The Tech-Gram in *Materials Research and Standards* and a complete review of criteria for Special Technical Publications plus review procedures for all papers are the major innovations. The Tech-Gram keeps not only ASTM members but non-Society members advised of Society affairs. The criteria for Special Technical Publications and the new review procedure have resulted not only in better STP's but in getting this material published more quickly than previously.

The work of the subcommittees of the Publications Committee is as follows:

Subcommittee on Periodicals:

The incorporation of a news letter—called Tech-Gram—in *Materials Research and Standards* which could be mailed separately to non-Society committee members was rec-

ommended by the subcommittee. It was felt such a news letter would foster interest and identification with ASTM among committee members who are not now members of ASTM. It was also recommended that the advertising in *MR&S* be dispersed throughout the magazine and this plus the Tech-Gram are major changes in the format.

The need for an advisory group to provide guidance as to new trends in the field for articles in *MR&S* is now being developed. Consideration on the need for a quick-entry journal comprised of letters or short papers has found little support.

In order to determine the effectiveness of the *Journal of Materials* a survey was conducted which indicated that *JOM* is appealing to the general type of readers rather than the individual concerned with his own specialty. Since *JOM* appears to be meeting the need of the reader particularly from the civil, metallurgical, and chemical engineers, it was recommended that it be left as is for the present as its image seems favorable.

Subcommittee on Special Technical Publications:

In order to assist the symposium chairmen in the planning of an ASTM Special Technical Publication criteria were established which must be met. This material now appears with the instructions to chairmen for presentation of a symposium at a national meeting since the same offer form of a paper and abstract are used by both standing committees. The reviewers' report form was completely revised and in the several months in which it has been in use has proved exceedingly effective. The offer form of a paper to ASTM was revised so that both the Meetings Committee and Publications Com-

REPORT OF COMMITTEE ON PUBLICATIONS

mittee requirements are on one page thus eliminating the previous forms, namely one for presentation and one for publication. The procedure to be followed by the Publications Committee in accepting papers for a Special Technical Publication was revised. It is through the new reviewers' report form and the procedure followed by the Publications Committee in reviewing an STP that months have been cut from the time the papers are submitted to the publication date.

Subcommittee on Standards:

The committee recommended to the Standards Committee the format for editorial changes in a designation for ASTM Standards.

In order to emphasize the change in the Book of Standards each year the word "Annual" has been added to the title. In addition to this the change in the color combination from year to year using a series of four sets of color combinations was voted by the subcommittee. This will drastically point up the obsolescence of the previous year's edition. Committees have been contacted to review the standards under their jurisdiction regarding illustrations to see (1) whether the illustrations are really needed and (2) if they are needed can they be clarified or simplified. The committee has expressed concern over the new format for the Book of Standards with respect to tables and illustrations appearing at the end of the standard. After an appropriate period of circulation of the new books, the staff will conduct a survey to elicit any comments on usability and readability that the user may care to offer in improving the format.

Volume 33 of the *Annual Book of ASTM Standards* is presently being studied to explore the alternatives in publishing the index and glossary now contained in this volume. This question was raised at the Open Meeting of the Publications Committee held during the 1969 Annual Meeting.

Open Meeting of Committee at 1969 Annual Meeting

In order to communicate what the Publications Committee is doing and why and to obtain feedback from the members, the first Open Meeting of the Publications Committee was held on 26 June at the 1969 An-

nual Meeting, Atlantic City, N. J. The question regarding Volume 33 of the Book of Standards and the charge of \$15 for this book was raised by one of the members and as noted above is being reviewed by the committee at the present time.

The publication of Tech-Gram eliminated the objection of one member that new standards are listed through the magazine but with the innovation of the Tech-Gram these new standards are grouped together.

The possibility of holding a forum with other societies regarding publication problems in general was suggested and this possibility is under consideration by the Committee.

Annual Book of ASTM Standards

The 32 parts of the *Annual Book of ASTM Standards* were published on schedule during 1969, and the 1970 volumes are on schedule.

The new format of the *Annual Book of ASTM Standards* appears in 11 parts of the 1970 volume, and the redesigned cover which will be in a different color each year will make it more apparent to the user that the annual standards of the Society change each year.

Starting with the 1970 Edition, a new Part 33 has been added which will include the Glossary of ASTM Definitions and the Index to ASTM Standards.

Journal of Materials

The quarterly *Journal* includes those reports that cover data on the properties and performance of commercial and potentially commercial materials and systems of materials. These reports are usually unrelated to other papers as in the case of Special Technical Publications. The Subcommittee on Periodicals reviewed the *Journal* this past year as mentioned previously. A secondary title, "ASTM's Journal on Applied Science Research," has been added to the cover page to clarify JOM's role in our field.

Materials Research and Standards

The major objectives of the magazine to provide a forum for the presentation of new concepts and major problems in the vital field of test measurement has been increasingly stressed through the past year. Lead

REPORT OF COMMITTEE ON PUBLICATIONS

articles have been solicited to reflect important measurement concepts and interviews have been published of those who contribute to or have especial cognizance of test measurement. Washington Newsfront points up ASTM's role in the government-industry dialogue. ASTM Test Methods Development centers on ASTM projects of broad interest. Test Method Forum department presents new ideas for test method development by the Society. The inclusion of the Tech-Gram, as mentioned previously, serves to keep both members and non-Society committee members advised of general Society announcements, information on new publications, and the Interim Letter Ballot. The consolidation of information concerning laboratory aids, call for papers, measurement courses, and pertinent literature into a department entitled, New Laboratory and Testing Aids, has permitted greater ease on the part of the reader to gain access to this information.

Respectfully submitted on behalf of the committee,

J. C. GROSSKREUTZ,
Chairman
R. W. BLETZACKER,
Acting Chairman

JANE B. WHEELER,
Secretary

RECORD OF PUBLICATIONS ISSUED

15 April 1969 to 15 April 1970

Regular Publications

1969 *Proceedings*
1969 *Yearbook*
1969 *Index to Standards*

Periodicals

Materials Research and Standards, 12 issues
Journal of Materials, 4 issues

Book of ASTM Standards

Part 1, 1970 edition
Part 2, 1970 edition
Part 3, 1970 edition
Part 4, 1970 edition
Part 5, 1969 edition
Part 6, 1969 edition
Part 7, 1969 edition
Part 8, 1969 edition
Part 9, 1969 edition

Part 10, 1969 edition
Part 11, 1970 edition
Part 12, 1970 edition
Part 13, 1970 edition
Part 14, 1969 edition
Part 15, 1970 edition
Part 16, 1969 edition
Part 17, 1969 edition
Part 18, 1969 edition
Part 19, 1969 edition
Part 20, 1970 edition
Part 21, 1970 edition
Part 22, 1969 edition
Part 23, 1969 edition
Part 24, 1969 edition
Part 25, 1969 edition
Part 26, 1969 edition
Part 27, 1969 edition
Part 28, 1969 edition
Part 29, 1969 edition
Part 30, 1969 edition
Part 31, 1969 edition
Part 32, 1970 edition

Special Technical Publications

STP

333 A *Directory of Testing Laboratories*
442 *Manual on Water*
443 *Atomic Absorption Spectroscopy*
444 *Performance of Deep Foundations*
450 *Vibration Effects on Earthquakes on Soils and Foundations*
451 *Reviews of Correlations of Objective-Subjective Methods in the Study of Odors and Taste*
452 *Interfaces in Composites*
453 *Electron Microfractography*
454 *Stainless Steel for Architectural Use*
455 *Gray, Ductile and Malleable Iron Castings*
456 *Highway Skid Resistance*
457 *Irradiation Effects in Structural Alloys for Thermal and Fast Reactors*
458 *Application Related Phenomenon in Zirconium and Its Alloys*
459 *Fatigue at High Temperature*
460 *Composite Materials: Testing and Design*
461 *Rapid Test Methods for Determination of Bitumen Content in Bituminous Mixtures*
462 *Effects of Environment and Complex Load History on Fatigue Life*

REPORT OF COMMITTEE ON PUBLICATIONS

- 464 *Fire Test Performance*
- 465 *Manual on Low Cycle Fatigue Testing*
- 466 *Impact Testing of Metals*
- 468 *A Manual on Methods for Retrieving and Correlating Data*
- 469 *Damage in Laser Glass*
- 471 *The Laboratory Handling and Storage of Peroxy Compounds*
- 473 *Fineness of Cement*
- 475 *Nomenclature and Definitions Applicable to Radiometric and Photometric Characteristics of Matter*

Data Series

DS

- 11 S1 *An Evaluation of the Elevated Rupture Properties of Wrought Temperature Tensile and Creep-Carbon Steel*
- 23 A-S2 *Second Supplement to Coden for Periodical Titles*
- 44 *A Survey of Effects of Lower Than Usual Rates of Strain on the Yield Strength of Metals*
- 45 *Compilation of Trade Names, Specifications, and Producers of Stainless Alloys and Super-alloys*
- 46 *X-Ray Emission Wavelengths and KEV Tables for Non-Diffractive Analysis*

Atomic and Molecular Data Publications

AMD

- 11 *Index of Mass Spectral Data*
- 31 *Molecular Formula List of Compounds, Names, and References to Published Infrared Spectra*
- 32 *Serial Number List of Compound Names and References to Published Infrared Spectra*
- 34 *Alphabetical List of Compound Names,*

Formulae, and References to Published Infrared Spectra

Compilations of Standards

- D-2 1969 *Compilation: Miscellaneous ASTM Standards for Petroleum Products*
- E-13 *Manual on Recommended Practice in Spectrophotometry*
- ASTM Manual for Rating Motor Fuels by Research and Motor Methods*
- ASTM Standards in Building Codes (Seventh Edition)*

Reprintings

STP

- 15 C *ASTM Manual on Quality Control of Materials (Ninth Printing)*
- 91 A *Guide for Fatigue Testing and the Statistical Analysis of Fatigue Data (Second Edition)*
- 315 D *Engine Test Sequences for Evaluating Automotive Lubricants for API Service MS (Reprint)*
- 410 *Plane Strain Crack Toughness Testing of High-Strength Metallic Materials (Revised Edition)*
- 434 *Manual on Sensory Testing Methods (Reprint)*
- 440 *Correlation of Subjective-Objective Methods in the Study of Odors and Taste (Reprint)*
- DS 2 *Report on Available Standard Samples, Reference Samples, and High-Purity Materials for Spectrochemical Analysis (Supersedes STP 58 E)*

Approved for Publication

- 11 new Special Technical Publications
- 1 Data Series publications
- 1 compilation
- 1 Atomic and Molecular Data Series
- 1 miscellaneous publications

APPENDIX III

REPORT OF COMMITTEE ON RESEARCH

The Committee on Research met twice in 1969: at Hawthorne, Calif., on 19 May 1969 and in Philadelphia, Pa., on 10 September 1969.

Plans were made to hold the new "Annual ASTM Distinguished Lecture on Research" at five universities and Dr. Robert Rushmer of the University of Washington will lecture on "Biomaterials: An Essential Ingredient in Bioengineering." Dr. John Mandel of the National Bureau of Standards is to prepare a 20-minute talk on "Statistical Design of Experiments" for a pilot video tape, to be made in cooperation with the ASTM staff and a local movie studio.

The Committee has expanded its membership to twelve and has broadened the

areas of representation of industry, education, and government research.

Discussions were held with the Committee on Fellowships and Grants-in-Aid as to how any overlap can be avoided and how the Society can get maximum benefit from its funds awarded to non-member researchers.

The Society's Research Fund, which is managed by the Committee, on 31 August 1969 showed a cash balance of \$16,954.55 and a principal of \$162,035.52.

Respectfully submitted on behalf of the committee,

H. V. STEWART,
Chairman

W. F. HULSE,
Secretary

APPENDIX IV

REPORT OF COMMITTEE ON SIMULATED SERVICE AND PERFORMANCE TESTING

Three meetings of the Committee on Simulated Service and Performance Testing were held during the period covered by this report: 2 April 1969 at Center Square, Pa., 25 June 1969 at Atlantic City, N. J., and 24 September 1969 at Philadelphia, Pa.

Two symposia were held at the Annual Meeting in Atlantic City under the Committee's sponsorship—Symposium on Simulated Service and Performance Testing for Floor Coverings and Symposium on Advanced Testing Techniques.

The committee formulated plans for a symposium on Bio-Engineering to be pre-

sented at the 1970 Annual Meeting in Toronto. A task group was formed under Francis Tatnall to plan an exhibit around this symposium and to exhibit simulated service testing at Society exposition space by trade associations or government agencies. NASA at Langely, Va., agreed to furnish such an exhibit as did the National Heart Institute.

Respectfully submitted on behalf of the committee,

W. S. MACLEOD,
Chairman

W. F. HULSE,
Secretary

APPENDIX V

REPORT OF COMMITTEE ON MEETINGS

In 1969 a prime objective of the Committee on Meetings was the restructuring of the meetings of the Society in order to serve the committees more efficiently. As a result a program was inaugurated to develop nine National Committee Weeks a year, generally one each month with the exception of June (Annual Meeting), July, and August.

The start on this program was made with the December Meeting, 1969. It is recognized that two or three years will be needed to institute this concept fully. The idea has been, on the whole, received favorably by the committees, who are making a great effort to cooperate.

The scope of the North American Materials Exposition, now an annual event, has been broadened to include new materials and materials systems.

For the first time, registration at Cincinnati in December was on the total honor system, that is, giving the members the privilege of attending meetings if not yet registered. Allowing registration when convenient will eliminate the long lines at the registration desks, and thus improve our service to the members. The system at Cincinnati worked very well and will again be used in Toronto in June 1970.

Eighteen symposia, with a total of 34 sessions, were approved for presentation at the Toronto meeting in June 1970, and tentative approval was given to five symposia to be presented at later dates.

1969 Annual Meeting

The 72nd Annual Meeting was held in Atlantic City, N. J., 22-27 June. There were meetings of 62 committees, plus eight symposia, having a total of 20 sessions, and eight workshop or informal sessions. Regis-

tration was 3686. Tinius Olsen II and L. Drew Betz were co-chairmen, and Philadelphia was the host district.

December 1969 Committee Week

Our first Committee Week was held in Cincinnati, Ohio, 7-12 December 1969. This meeting replaced the former Winter Meeting, and 24 committees convened during the week. The Symposium on Coatings in Space was cosponsored by Committee E-10, Subcommittee VI, and NASA, in cooperation with Committee E-21. The registration was 912. John F. Kahles was General Chairman, and the Ohio Valley Council was the host district.

January 1970 Committee Week

January Committee Week was held in Fort Lauderdale, Fla., from the 8th to 15th, with Committees D-19, E-7, E-18, and F-8 meeting. Since there was no regular registration procedure, the estimated number of persons in attendance is 240.

March 1970 Committee Week

The Ohio Valley District Council was again host for the March Committee Week held 7-12 March 1970 in the Netherlands-Hilton Hotel. Committees C-22, D-9, D-20, D-27, and D-30 convened with a total registration of 453.

Future Meetings

Annual Meetings and North American Materials Expositions:

21-26 June 1970, Toronto, Ont., Canada
27 June-2 July 1971, Atlantic City, N. J.
25-30 June 1972, Los Angeles, Calif.

REPORT OF COMMITTEE ON MEETINGS

24-29 June 1973, ASTM 75th Annual Meeting, Philadelphia, Pa.

23-28 June 1974, Washington, D. C.

22-27 June 1975, Atlantic City, N. J.

Committee Weeks:

13-18 September 1970, Washington, D. C.

26-30 October 1970, Buffalo, N. Y.

15-20 November 1970, Williamsburg, Va.

6-11 December 1970, Kansas City, Mo.

7-15 January 1971, Fort Lauderdale, Fla.

7-12 February 1971, San Antonio, Tex.

28 February-5 March 1971, Atlanta, Ga.

18-23 April 1971, Minneapolis, Minn.

19-24 September 1971, San Francisco, Calif.

18-22 October 1971, Chicago, Ill.

14-19 November 1971, Philadelphia, Pa.

5-10 December 1971, Bal Harbour, Fla.

Respectfully submitted on behalf of the committee,

D. I. FINCH,
Chairman

J. B. BIDWELL,
Secretary

APPENDIX VI

REPORT OF COMMITTEE ON CONSUMER STANDARDS

The Committee on Consumer Standards held three meetings during the Society year: on 17 July 1969, at Gaithersburg, Md., and on 22 October 1969, and 12 March 1970, in Philadelphia, Pa. New members added during the year were: Guenther Baumgart, P. N. Martin, and Herbert Phillips, alternate to Mr. Baumgart.

In August, a conference was held between representatives of ASTM and the Consumer Council of the American National Standards Committee to clarify the part that each organization should play in the effort to develop standards for consumer products. This resulted in a set of recommendations to the Boards of Directors of the two organizations, setting forth a suggested modus operandi in this area.

In its March 1969 meeting, the committee selected a group of consumer products for initial study to determine whether consumer standards might be needed for them. Among these were: clothes washing detergents, automatic washing machines, mattresses, carpeting, vacuum cleaners, paint, electric blankets, and garment sizes. As the result of staff study and committee action, the following was accomplished for each of these:

The committee recommended to the Board of Directors that Committee D-12 on Soaps and Other Detergents be requested to develop performance test methods for clothes washing detergents. Committee D-12 organized a subcommittee to work in this area, established liaison with ISO TC/38, and began work to develop the requested test methods.

It was learned that the Association of Home Appliance Manufacturers has devel-

oped performance tests for home washing machines and that these tests had been submitted to the canvass procedures of ANSI.

Negotiations were undertaken by the staff to explore with the National Association of Bedding Manufacturers the possibility of bringing NABM test methods for mattresses into ASTM. These negotiations are as yet inconclusive.

Committee D-13 on Textile Materials agreed to explore the question whether it wishes to accept the responsibility for standards for carpeting. This decision has not yet been made.

Negotiations were undertaken by the staff to explore with the Vacuum Cleaner Manufacturers Association the possibility of bringing VCMA test methods for vacuum cleaners into ASTM. These negotiations are as yet inconclusive.

The 12 March 1970 meeting of the committee was attended by officers of Committee D-1 on Paint, Varnish, Lacquer and Related Products, and a discussion of performance specifications for paint took place. The Consumer Standards Committee voted to ask Committee D-1 to begin development of standards defining the essential performance characteristics of a small group of representative high-volume paints for consumer use.

It was learned that the Association of Home Appliance Manufacturers has developed performance tests for electric blankets and that it plans to update these tests and submit them to the canvass procedure of ANSI.

No action was taken on standards for garment sizes.

The staff undertook a study of standards

REPORT OF COMMITTEE ON CONSUMER STANDARDS

for home security devices (burglar alarm systems). Discussions were undertaken with Underwriters' Laboratories and with the Security Equipment Manufacturers Association. This study is as yet inconclusive.

Work was begun on drafting a set of by-laws for the committee, and a recommendation was sent to the Board of Directors re-

garding budget and staffing for the coming year.

Respectfully submitted on behalf of the committee,

G. S. WHAM,
Chairman

A. Q. MOWBRAY,
Secretary

APPENDIX VII

REPORT OF COMMITTEE ON TECHNICAL COMMITTEE OPERATIONS

The Committee on Technical Committee Operations held three meetings since the last report: on 10 July 1969; 23 October 1969; and 19 March 1970. All meetings were held at ASTM Headquarters.

Changes in membership since the last report were as follows: R. F. Abernethy, U. S. Bureau of Mines, filling a vacancy; W. C. Cullen, National Bureau of Standards, replacing Bruce Foster; A. O. Schaefer, Struthers Wells Corp., replacing A. G. Cook.

Regulations Governing ASTM Technical Committees

A number of suggested changes in the Regulations were studied with no major revisions recommended at this time. The changes made were essentially editorial in nature. Proposed revisions which have been studied but on which action is pending involve: (1) review of negative votes; (2) subcommittee procedure; and (3) discharge of inactive committees.

Review of Scopes of Technical Committees

A task group is completing its assignment with the additional responsibility of consider-

ing the editorial review of scopes as referred to the committee by the Board of Directors.

Restructuring Plan

A task group has been designated to review the Regulations in terms of recommending any necessary revisions to implement the restructuring plan as it affects technical committee procedure.

Liaison Between Technical Committees

This subject is receiving careful study in an effort to improve an unsatisfactory communications problem between technical committees with overlapping interests. A task group has been assigned this project to be included in its broad assignment of a review of the entire technical committee structure.

Respectfully submitted on behalf of the committee,

F. M. GAVAN,
Chairman

L. C. GILBERT,
Secretary

APPENDIX VIII

REPORT OF COMMITTEE ON DISTRICTS

The Standing Committee on District Activities, under the chairmanship of D. N. Rickles, met 23 June 1969 during the Society's Annual Meeting in Atlantic City, N. J. A series of proposals were presented in accordance with the Society's Long Range Plan, intended to assist the districts to take a more active role.

To administer this increased activity, the Board of Directors at its September 1969 meeting voted to discharge the Standing Committee on District Activities and in its place to organize a District Activities Council composed of one member and one alternate from each district to meet each year at the Society's Annual Meeting. In addition, the Board voted to create a new Standing Committee on Districts, to meet at least four times per year, to act as the executive committee of the District Activities Council, and to advise the Board on general policy concerning district activities.

The Standing Committee on Districts (SCD), composed of N. Chryssaopoulos, chairman, S. J. Golub, H. C. Zweifel, J. H. Phillips, and Walter A. Gammel, Sr., held its organizational meeting on 9 December 1969, during the ASTM Winter Meeting in Cincinnati, Ohio. During that meeting attended by President Crane and Vice-President Smith, the committee voted to recommend to the Board the holding of an indoctrination Conference for District Chairmen and Secretaries so that the incoming officers could be brought up-to-date with Society and District objectives, the duties of the officers, and the type of activities that would promote the goals of ASTM. The committee's recommendation was approved by the Board and the Conference was held at ASTM Headquarters on 26 May 1970.

At its second meeting, held at ASTM Headquarters on 9 March 1970, the com-

mittee completed a review and revision of the Proposed Regulations Governing ASTM Districts and established the program for the Conference for District Chairmen and Secretaries. This meeting was attended by Vice-President Smith and Director Loudon as ex-officio member representing the Board Committee on Society Development.

At the recommendation of the SCD, the Board authorized at its January meeting, for a two-year trial period, a policy of rebates to active districts to assist in financing their activities.

Student award programs are continuing in most districts with the same benefits for the students as before but without enrolling the students as members.

With the phasing out of the student category of membership, the SCD is urging the districts to stimulate contacts with faculty on campuses, especially in districts where this is lacking. The student award program is considered to be a very effective program for reaching faculty.

There were 21 district meetings held. President Crane addressed three, six were held jointly with other societies, and eight districts had special student award programs. One of the Ohio Valley District meetings was held during the December Committee Week.

The SCD will hold a meeting immediately following the Conference for District Chairmen and Secretaries to evaluate the results of the Conference. It will also hold a meeting during the Annual Meeting in Toronto immediately following the meeting of the District Activities Council.

Respectfully submitted on behalf of the committee,

N. CHRYSSAPOPOULOS,
Chairman

F. F. VAN ATTA,
Secretary

APPENDIX IX

REPORT OF COMMITTEE ON FELLOWSHIPS AND GRANTS-IN-AID

The Committee on Fellowships and Grants-in-Aid met at a deferred meeting 17 April 1970 in New York City.

Because of the rising costs of education the Board of Directors in May of 1969 authorized an increase in the amount of the Grants-in-Aid from \$1000 to \$1500 beginning in 1970. In January 1970 it named these grants the C. Lawrence Warwick Memorial Grants-in-Aid.

The committee examined 17 applications from 23 schools invited to apply and selected five to receive the \$1500 grants for the 1970-71 school year as follows: Alfred University, Alfred, N. Y.; Denison University, Granville, Ohio; University of Houston, Houston, Tex.; University of Notre Dame, Notre Dame, Ind.; and Union College, Schenectady, N. Y.

The committee selected the University of Pennsylvania, Philadelphia, Pa., to receive the \$6500 Robert J. Painter Memorial Fellowship for the 1971-72 school year.

Reasselaer Polytechnic Institute, Troy, N. Y., which was awarded the fellowship for

the 1970-71 school year, has selected David W. Dickinson, who will be in his terminal year of his Ph.D. program majoring in materials.

The Edgar Marburg Scholarship at the University of Pennsylvania continues to be held by Joseph D. Mann, a sophomore in civil engineering.

At its January 1970 meeting the Board of Directors authorized an increase in annual allocation for Grants-in-Aid from \$7500 to \$15,000 with the understanding that the Committee on Research and the Committee on Fellowships and Grants-in-Aid would be responsible for jointly recommending how the additional funds should be used. The committees hope to meet within the next few weeks to explore their respective areas of interest in grants to educational institutions.

Respectfully submitted on behalf of the committee,

R. A. SCHATZEL,
Chairman

F. F. VAN ATTA,
Secretary

APPENDIX X

REPORT OF COMMITTEE ON REAL ESTATE

The Committee on Real Estate is responsible as an advisory group to the Board of Directors on handling the Society's property. The committee met at Society headquarters 22 June 1969.

Following the demolition early in the year of buildings on the property behind headquarters between Arch and Cherry Streets, efforts were made to obtain a satisfactory short-term lease as a parking lot. Since the best rental offered by prospective lessees appeared inadequate considering the disad-

vantage of tying up the property for five years, the committee supported a recommendation of the Managing Director to reject the lease and to continue efforts to arrange for a long-term lease.

Respectfully submitted on behalf of the committee,

M. N. CLAIR,
Chairman

F. F. VAN ATTA,
Secretary

REPORT OF COMMITTEE A-1 ON STEEL

Committee A-1 on Steel met twice during 1969. Following the policy adopted in recent years it participated in the Annual Meeting of the Society in Atlantic City, N. J., on June 23 to 25, but met at mid-year with a group of committees having common interests, at Pittsburgh, Pa., on Dec. 1 to 3.

The period of many and rapid changes in which we are living is very evident in the demands placed upon ASTM technical committees. The effort has been made in A-1 to respond to needs as they are expressed, to maintain a degree of flexibility in our attitudes, while maintaining always the technical excellence of our specifications.

Committee A-1 would like to write steel specifications that meet the needs of all sorts of consumers. To do this we must have strong and persistent consumer members, and this is a goal of our committee.

Liaison with other specification-writing or using groups has changed during the course of the year. Particularly active is our connection with that group in SAE responsible for AMS specifications. A joint task group has been set up to write specifications for steel nails for gypsum board usage. The ASTM-ASME Boiler and Pressure Vessel Code Committee Liaison Committee has adopted new approaches to its work, and efforts are being made for more effective communication between the two organizations with regard to steel specification requirements in this important area of engineering and industry.

At the Annual Meeting in Toronto the following men received the Committee A-1 Certificate of Recognition: M. S. Riegel, chairman, Subcommittee VII on Steel Wheels and Tires for Railway Service (1960-1970), T. D. Parker, chairman, Subcommittee X on Steel Tubing (1968-1970), W. J. Stewart, chairman, Subcommittee XIII on Methods of

Testing (1957-1970), G. A. Remley, chairman, Subcommittee XV on Bar Steels (1968-1970), A. O. Schaefer, chairman (1964-1970), A. G. Cook, producer, vice-chairman (1964-1970), and Morris Kosten, chairman, Subcommittee XIX on Steel Sheet (1968-1970).

The following subcommittee chairmen were appointed during the year to succeed retiring chairmen:

Subcommittee X, W. R. Sylvester
Subcommittee XIII, Glenn Selby
Subcommittee XV, H. E. Lunt
Subcommittee XIX, R. N. Johnson
Subcommittee XX, W. C. Stammer

USA Committee for International Standardization of Steel—Most of the activity during the past year has centered on development of documents and pertinent USA positions for the meeting of ISO/TC 17 on Steel scheduled June 1-5, 1970. The USA will have a seven-man delegation attending this meeting which has approximately 50 action items on its agenda.

During the past year delegates from the USA attended meetings of the following ISO/TC 17 subcommittees and working groups: Subcommittee 1 on Methods of Chemical and Spectrochemical Analysis, WG 1 on Methods of Mechanical Testing, WG 4 on Heat Treated Steels, Alloyed Steels and Free Cutting Steels, WG 7 on Test Methods Other than Mechanical and Chemical Analysis, WG 9 on Template and Blackplate, WG 10 on Steels for Pressure Vessels, and WG 12 on Steel Sheet and Strip and Hot Dipped Galvanized Steel Sheet and Strip.

In WG 12, for which the USA holds the secretariat, after two meetings two draft proposals are nearing final approval: Draft ISO Proposal for Hot Rolled Carbon Steel Sheet of Commercial and Drawing Qualities, and Draft ISO Proposal for Cold Reduced

REPORT OF COMMITTEE A-1

Carbon Steel Sheet of Commercial and Drawing Qualities.

Under discussion are draft proposals for the following products: hot-rolled carbon steel sheet of structural quality, cold-reduced carbon steel sheet of structural quality, continuous hot-dipped galvanized hot-rolled carbon steel sheet of commercial and drawing qualities, and continuous hot-dipped galvanized cold-reduced carbon steel sheet of commercial and drawing qualities.

Since the beginning of USA participation in international standardization of steel products late in 1959, C. L. Kent of the Jones & Laughlin Steel Corp. has been chairman of the activity. With his retirement from Jones & Laughlin this year, Mr. Kent was replaced in this post by W. H. Mayo, U. S. Steel Corp.

RECOMMENDATIONS ACCEPTED BY THE COMMITTEE ON STANDARDS

Subsequent to the 1969 annual report, Committee A-1 presented to the Society through the Committee on Standards the following recommendations which became effective Nov. 7, 1969:

Withdrawal of Tentative:

- A 468-62 T**, Method of Test for Normal Magnetic Induction Characteristics of Carbon and Alloy Steel Generator Rotor Forgings (Subcommittee VI)

This method is replaced by A 341.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee A-1 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which became effective on the dates indicated:

New Standard Specifications for:

- A 600-69**, High-Speed Tool Steel (Subcommittee XXIX) (effective Nov. 14, 1969)

This specification covers tungsten type and

molybdenum type high-speed steels available as annealed, hot-rolled bars, forgings, or sheet and annealed, cold-finished bars or forgings, used primarily in the fabrication of tools.

- A 604-70**, Macroetch Testing of Consumable Electrode Vacuum-Arc Remelted Steel Bars and Billets (Subcommittee VI) (effective March 19, 1970)

This method of testing and inspection is applicable to bars, billets, and blooms of carbon, alloy, and stainless steel which have been consumable electrode vacuum arc remelted.

- A 605-70**, Nickel-Cobalt-Molybdenum-Chromium Alloy Steel Plates, Quenched and Tempered, for Pressure Vessels (Subcommittee XI) (effective March 19, 1970)

This specification covers a class of 9 percent nickel, 4 percent cobalt, molybdenum-chromium alloy steel plates at an ultimate tensile strength level of 190 to 220 ksi (133.6 to 154.7 kgf/mm²) for use in the quenched and tempered condition, and intended for the construction of pressure vessels and other pressure equipment. Construction involving fusion welding is intended and welding technique is of fundamental importance.

- A 606-70**, Steel, Hot-Rolled and Cold-Rolled Sheet and Strip, High-Strength, Low-Alloy with Improved Corrosion Resistance (Subcommittee XIX) (effective April 13, 1970)

This specification covers high-strength, low-alloy hot-rolled and cold-rolled sheet and strip in cut lengths or coils, intended for use in structural and miscellaneous purposes, where savings in weight or added durability are important.

- A 607-70**, Steel Sheet and Strip, Hot-Rolled and Cold-Rolled, High-Strength, Low-Alloy Columbium and/or Vanadium (Subcommittee XIX) (effective April 13, 1970)

This specification covers high-strength low-alloy columbium and/or vanadium hot-rolled and cold-rolled steel sheet and strip in either cut lengths or coils, intended for

REPORT OF COMMITTEE A-1

use in structural and miscellaneous purposes, where greater strength and savings in weight are important.

A 609 - 70, Longitudinal Beam Ultrasonic Inspection of Carbon and Low-Alloy Steel Castings (Subcommittee VIII) (effective May 15, 1970)

This specification covers the standards and procedures for the pulse-echo ultrasonic inspection of heat-treated carbon and low-alloy steel castings by the longitudinal beam technique.

A 611 - 70, Steel, Cold Rolled Sheet, Carbon Structural (Subcommittee XIX) (effective June 12, 1970)

This specification covers cold-rolled carbon structural steel sheet, in cut lengths or coils. It includes five strength levels designated as Grade A with yield point 25,000 psi minimum; Grade B with 30,000 psi minimum; Grade C with 33,000 psi minimum; Grade D with 40,000 psi minimum; and Grade E with 80,000 psi minimum. Grades A, B, C, and D have moderate ductility whereas Grade E is a full-hard product with no specified minimum elongation.

Tentative Adopted as Standard Without Revision:

A 108 - 69 (formerly A 108 - 61 T), Specification for Cold-Finished Carbon-Steel Bars and Shafting (Subcommittee XV) (effective July 18, 1969)

A 570 - 70 (formerly A 570 - 66 T), Specification for Hot-Rolled Carbon Steel Sheets and Strip, Structural Quality (Subcommittee XIX) (effective June 12, 1970)

Revision of Standards, Immediate Adoption:

A 2 - 69 (formerly A 2 - 68), Specification for Steel Girder Rails of Plain, Grooved, and Guard Types (Subcommittee I) (effective July 18, 1969)

The electric furnace process was added to Section 2.

A 6 - 69a (formerly A 6 - 69), Specification for General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling,

and Bars for Structural Use (Subcommittee II) (effective Sept. 25, 1969)

This specification was revised to require that silicon content be reported in ladle analysis, to allow wider use of round tensile specimens, and to allow the use of bend tests with sheared or flame-cut edges.

A 20 - 69a (formerly A 20 - 69), Specification for General Requirements for Delivery of Steel Plates for Pressure Vessels (Subcommittee XI) (effective July 18, 1969)

Special requirements were added for testing of quenched and tempered or accelerated cooled plates and provision was made for use of sheared or gas cut bend test specimens.

A 21 - 69a (formerly A 21 - 69), Specification for Carbon Steel Axles, Non-Heat Treated and Heat Treated for Railway Use (Subcommittee VI) (effective Nov. 14, 1969)

This specification was revised to completely update the specification to conform to AAS Specification M 101.

A 36 - 70 (formerly A 36 - 69a), Specification for Structural Steel (Subcommittee II) (effective April 13, 1970)

This revision eliminated modifications and made requirements more consistent.

A 53 - 69a (formerly A 53 - 69), Specification for Welded and Seamless Steel Pipe (Subcommittee IX) (effective Sept. 25, 1969)

This revision was to correct an error in the original proposal that would have required impractically high mill hydrostatic test pressures for pipe sizes under 2-in. It also revised the chemical requirements, the elongation requirements, and the flattening test requirements for clarification.

A 113 - 70 (formerly A 113 - 66), Specification for Structural Steel for Locomotives and Cars (Subcommittee II) (effective April 13, 1970)

This revision eliminated modifications and made requirements more consistent.

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A 120 - 69 (formerly A 120 - 68a), Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Ordinary Uses (Subcommittee IX) (effective Dec. 19, 1969)

This was revised to include requirements for galvanized pipe for use with solder-type fittings.

A 131 - 69 (formerly A 131 - 61), Specification for Structural Steel for Ships (Subcommittee II) (effective Sept. 25, 1969)

This was revised to update this document so that it reflects present requirements for ship hull steel.

A 131 - 70 (formerly A 131 - 69), Specification for Structural Steel for Ships (Subcommittee II) (effective April 13, 1970)

This revision eliminated modifications and made requirements more consistent.

A 161 - 70 (formerly A 161 - 69), Specification for Seamless Low-Carbon and Carbon-Molybdenum Steel Still Tubes for Refinery Service (Subcommittee X) (effective June 12, 1970)

This was revised to permit the use of any of the standard machined round tension specimens.

A 178 - 70 (formerly A 178 - 69), Specification for Electric-Resistance Welded Carbon Steel Boiler Tubes (Subcommittee X) (effective June 12, 1970)

The marking requirements were revised.

A 185 - 69 (formerly A 185 - 68), Specification for Wire Fabric for Concrete Reinforcement (Subcommittee V) (effective July 18, 1969)

A test method was added for weld testing on welded wire fabric.

A 193 - 70 (formerly A 193 - 69), Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service (Subcommittee XXII) (effective Jan. 22, 1970)

The revision was to completely update the specification and change the title.

A 200 - 70 (formerly A 200 - 66), Specification for Seamless Intermediate Alloy-Steel Tubes for Refinery Service (Subcommittee X) (effective June 12, 1970)

This revision permitted the use of any of the standard machined round tension specimens.

A 213 - 70 (formerly A 213 - 66), Specification for Seamless Ferritic and Austenitic Alloy Steel Boiler, Superheater, and Heat Exchanger Tubes (Subcommittee X) (effective June 12, 1970)

This revision accommodated ASME request to make specification minimums consistent with P-5 post-weld heat treatment of 1250 F minimum.

A 214 - 70 (formerly A 214 - 69), Specification for Electric Resistance-Welded Carbon Steel Heat-Exchanger and Condenser Tubes (Subcommittee X) (effective June 12, 1970)

The marking requirements were revised.

A 216 - 69 (formerly A 216 - 68), Specification for Carbon-Steel Castings Suitable for Fusion Welding for High-Temperature Service (Subcommittee XXII) (effective July 18, 1969)

Table I was revised to include the residual elements for vanadium.

A 216 - 70 (formerly A 216 - 69), Specification for Carbon-Steel Castings Suitable for Fusion Welding for High-Temperature Service (Subcommittee XXII) (effective Jan. 22, 1970)

This specification was revised to improve the marking requirements.

A 217 - 70 (formerly A 217 - 69), Specification for Alloy Steel Castings for Pressure-Containing Parts Suitable for High-Temperature Service (Subcommittee XXII) (effective Jan. 22, 1970)

The revision was to improve the marking requirements of this specification.

A 226 - 70 (formerly A 226 - 69), Specification for Electric-Resistance Welded Carbon Steel Boiler and Superheater Tubes

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for High-Pressure Service (Subcommittee X) (effective June 12, 1970)

The marking requirements were revised.

A 236 - 69a (formerly A 236 - 69), Specification for Carbon Steel Forgings for Railway Use (Subcommittee VI) (effective Nov. 14, 1969)

The revision was to completely update the specification to conform to AAR Specification M 101.

A 242 - 70 (formerly A 242 - 68), Specification for High-Strength Low-Alloy Structural Steel (Subcommittee II) (effective April 13, 1970)

This revision eliminated modifications and made requirements more consistent.

A 266 - 69 (formerly A 266 - 67), Specification for Carbon Steel Forgings for Seamless Drums, Heads, and Other Pressure Vessel Components (Subcommittee VI) (effective Nov. 14, 1969)

The revision was to completely update the specification.

A 268 - 70 (formerly A 268 - 68), Specification for Seamless and Welded Ferritic Stainless Steel Tubing for General Service (Subcommittee X) (effective June 12, 1970)

This revision added a new Grade TP-430 Ti, a long-standing available grade which should have specification coverage.

A 283 - 70 (formerly A 283 - 67), Specification for Low and Intermediate Tensile Strength Carbon Steel Plates of Structural Quality (Subcommittee II) (effective April 13, 1970)

This revision eliminated modifications and made requirements more consistent.

A 284 - 70 (formerly A 284 - 66), Specification for Low and Intermediate Tensile Strength Carbon-Silicon Steel Plates for Machine Parts and General Construction (Subcommittee II) (effective April 13, 1970)

This revision eliminated modifications and made requirements more consistent.

A 302 - 69a (formerly A 302 - 69), Specification for Manganese-Molybdenum-Nickel Alloy Steel Plates for Pressure Vessels (Subcommittee XI) (effective July 18, 1969)

This revision clarified heat treatment requirements and in what conditions plates may be ordered or supplied, and added New Supplementary Requirement S2, Magnetic Particle Inspection.

A 312 - 70 (formerly A 312 - 69), Specification for Seamless and Welded Austenitic Steel Pipe (Subcommittee X) (effective June 12, 1970)

The tensile requirements were revised.

A 325 - 70 (formerly A 325 - 68), Specification for High-Strength Bolts for Structural Steel Joints Including Suitable Nuts and Plain Hardened Washers (Subcommittee XXVI) (effective Jan. 22, 1970)

This was revised to add the weathering steels and low-carbon martensitic steels.

A 328 - 69 (formerly A 328 - 67), Specification for Steel Sheet Piling (Subcommittee II) (effective July 18, 1969)

This revision eliminated a high-strength low-alloy grade which is now available in A 572.

A 333 - 70 (formerly A 333 - 69), Specification for Seamless and Welded Steel Pipe for Low-Temperature Service (Subcommittee X) (effective June 12, 1970)

The tensile requirements were revised.

A 334 - 70 (formerly A 334 - 69), Specification for Seamless and Welded Carbon and Alloy-Steel Tubes for Low-Temperature Service (Subcommittee X) (effective June 12, 1970)

The tensile requirements were revised.

A 335 - 70 (formerly A 335 - 65), Specification for Seamless Ferritic Alloy Steel Pipe for High-Temperature Service (Subcommittee X) (effective June 12, 1970)

The tensile requirements were revised.

A 336 - 70 (formerly A 336 - 68), Specification for Alloy Steel Forgings for Seamless

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Drum, Heads, and Other Pressure Vessel Components (Subcommittee VI) (effective Jan. 22, 1970)

The revision was to completely update the specification, to make changes requested by members, and to change the title.

A 353 - 70 (formerly A 353 - 67a), Specification for Nine Percent Nickel Alloy Steel Plates, Double-Normalized and Tempered, for Pressure Vessels (Subcommittee XI) (effective April 13, 1970)

This revision changed the toughness requirements to conform to requirements of ASME Boiler Code.

A 357 - 70 (formerly A 357 - 67), Specification for Five Percent Chromium, One Half Percent Molybdenum Alloy Steel Plates for Pressure Vessels (Subcommittee XI) (effective April 13, 1970)

This revision reinstated permission to use sheet-type tension specimen.

A 369 - 70 (formerly A 369 - 65), Specification for Ferritic Alloy Steel Forged and Bored Pipe for High-Temperature Service (Subcommittee X) (effective June 12, 1970)

The heat treatment requirements were revised.

A 372 - 69 (formerly A 372 - 67), Specification for Carbon and Alloy Steel Forgings for Pressure Vessel Shells (Subcommittee VI) (effective Nov. 14, 1969)

This was revised to add a new class (VIII) and several minor revisions.

A 376 - 70 (formerly A 376 - 64), Specification for Seamless Austenitic Steel Pipe for High-Temperature Central Station Service (Subcommittee X) (effective June 12, 1970)

The tensile requirements were revised.

A 387 - 69 (formerly A 387 - 67), Specification for Chromium-Molybdenum Alloy Steel Plates for Pressure Vessels (Subcommittee XI) (effective July 18, 1969)

The revision defines better the purpose of accelerated cooling rate and the marking requirements were revised.

A 387 - 70 (formerly A 387 - 69), Specification for Chromium-Molybdenum Alloy Steel Plates for Pressure Vessels (Subcommittee XI) (effective April 13, 1970)

This was to revise the carbon limits for Grades D and E to achieve desired mechanical properties in plates over 5 in. thick.

A 400 - 69 (formerly A 400 - 67), Recommended Practice for Selection of Steel Bar Compositions According to Section (Subcommittee XV) (effective Nov. 14, 1969)

This was revised to clarify Sections 2b, 3a, 3b; Section 6, Tables III, IV, V. Table II was deleted.

A 405 - 70 (formerly A 405 - 66), Specification for Seamless Ferritic Alloy Steel Pipe Specially Heat Treated for High-Temperature Service (Subcommittee X) (effective June 12, 1970)

The tensile requirements were revised.

A 414 - 69 (formerly A 414 - 64), Specification for Carbon Steel Sheets of Flange Quality for Pressure Vessels (Subcommittee XIX) (effective Nov. 21, 1969)

This was revised to provide additional grades needed by industry for flange-quality sheets.

A 430 - 70 (formerly A 430 - 64), Specification for Austenitic Steel Forged and Bored Pipe for High-Temperature Service (Subcommittee X) (effective June 12, 1970)

The ladle analysis requirements were revised to permit the use of spectrochemical techniques.

A 440 - 70 (formerly A 440 - 66), Specification for High-Strength Structural Parts (Subcommittee II) (effective April 13, 1970)

This revision eliminated modifications and made requirements more consistent.

A 441 - 70 (formerly A 441 - 68), Specification for High-Strength Low-Alloy Structural Manganese Vanadium Steel (Subcommittee II) (effective April 13, 1970)

This revision eliminated modifications and made requirements more consistent.

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A 488 - 69 (formerly A 488 - 68), Recommended Practice for Qualification of Procedures and Personnel for the Welding of Steel Castings (Subcommittee VIII) (effective July 18, 1969)

Paragraph 8 (e) was clarified.

A 496 - 70 (formerly A 496 - 64), Specification for Deformed Steel Wire for Concrete Reinforcement (Subcommittee V) (effective June 25, 1970)

This revision accommodated the American Concrete Institute Building Code.

A 497 - 69 (formerly A 497 - 68), Specification for Deformed Welded Wire Fabric for Concrete Reinforcement (Subcommittee V) (effective July 18, 1969)

A test method was added for weld testing on deformed welded wire fabric.

A 497 - 70 (formerly A 497 - 69), Specification for Welded Deformed Steel Wire Fabric for Concrete Reinforcement (Subcommittee V) (effective June 25, 1970)

This revision brought the specification up to date in line with the provisions of the American Concrete Institute Building Code and general use of the product in highway construction.

A 504 - 70 (formerly A 504 - 68), Specification for Wrought Carbon Steel Wheels (Subcommittee VII) (effective Jan. 22, 1970)

The revision was to completely update this specification.

A 508 - 69 (formerly A 508 - 68), Specification for Quenched and Tempered Vacuum Treated Carbon and Alloy Steel Forgings for Pressure Vessels (Subcommittee VI) (effective Nov. 14, 1969)

A new strength level was added and other minor revisions were made.

A 511 - 70 (formerly A 511 - 68), Specification for Seamless Stainless Steel for Mechanical Tubing (Subcommittee X) (effective June 12, 1970)

Grade 403 was revised to delete nickel.

A 513 - 70 (formerly A 513 - 69), Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing (Subcommittee X) (effective June 12, 1970)

This revision reduced the maximum average micro-inch values in the 1 to 2½ in. OD range and provided for clean up of mandrel-drawn tubing by machining.

A 514 - 69a (formerly A 514 - 69), Specification for High-Yield Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding (Subcommittee II) (effective July 18, 1969)

A new type RQ100 was added.

A 516 - 70 (formerly A 516 - 69), Specification for Carbon Steel Plates for Pressure Vessels for Moderate and Lower Temperature Service (Subcommittee XI) (effective Jan. 20, 1970)

The revision was to lower minimum manganese requirement for Grades 55 and 60 so that production will be technologically practical. Also, it was revised to delete the grain size test requirement when impact tests are made.

A 517 - 69a (formerly A 517 - 69), Specification for High-Strength Alloy Steel Plates, Quenched and Tempered for Pressure Vessels (Subcommittee XI) (effective July 18, 1969)

Minor changes were made in check analysis of Grade F and H; a new Grade P was added; retest provisions which are now covered in A 20 were deleted.

A 517 - 70 (formerly A 517 - 69a), Specification for High-Strength Alloy Steel Plates, Quenched and Tempered, for Pressure Vessels (Subcommittee XI) (effective April 13, 1970)

This revision changed the toughness requirements to conform to requirements of ASME Boiler Code.

A 533 - 69a (formerly A 533 - 69), Specification for Manganese-Molybdenum-Nickel Alloy Steel Plates, Quenched and Tempered, for Pressure Vessels (Subcommittee XI) (effective July 18, 1969)

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The provisions now covered by A 20 were deleted.

A 537 - 69 (formerly A 537 - 67a), Specification for Carbon-Manganese Silicon Steel Plates, Heat-Treated, for Pressure Vessels (Subcommittee XI) (effective July 18, 1969)

Changes were made in Sections 3.1 and 3.3.

A 542 - 69a (formerly A 542 - 69), Specification for Chromium-Molybdenum Alloy Steel Plates, Quenched and Tempered for Pressure Vessels (Subcommittee XI) (effective July 18, 1969)

Provisions now covered by A 20 were deleted.

A 542 - 70 (formerly A 542 - 69a), Specification for Chromium-Molybdenum Alloy Steel Plates, Quenched and Tempered, for Pressure Vessels (Subcommittee XI) (effective April 13, 1970)

The carbon limit was revised to achieve desired mechanical properties in plates over 5 in. thick. The silicon limits were changed to enhance the cleanliness of vacuum degassed steel. A new Class 4 was added.

A 543 - 69 (formerly A 543 - 68), Specification for Nickel-Chromium-Molybdenum Alloy Steel Plates, Quenched and Tempered for Pressure Vessels (Subcommittee XI) (effective July 18, 1969)

Provisions now covered by A 20 were deleted.

A 553 - 70 (formerly A 553 - 68), Specification for Eight and Nine Percent Nickel Alloy Steel Plates, Quenched and Tempered, for Pressure Vessels (Subcommittee XI) (effective April 13, 1970)

The toughness requirements were changed to conform to requirements of ASME Boiler Code.

A 554 - 70 (formerly A 554 - 65), Specification for Welded Stainless Steel Mechanical Tubing (Subcommittee X) (effective June 12, 1970)

This was revised to conform with two new grades.

A 572 - 70 (formerly A 572 - 68), Specification for High-Strength Low-Alloy Columbium-Vanadium Steels of Structural Quality (Subcommittee II) (effective April 13, 1970)

This revision eliminated modifications and made requirements more consistent.

A 573 - 70 (formerly A 573 - 68), Specification for Structural Carbon Steel Plates of Improved Toughness (Subcommittee II) (effective April 13, 1970)

This revision eliminated modifications and made requirements more consistent.

A 577 - 70 (formerly A 577 - 68), Specification for Ultrasonic, Shear Wave Inspection of Steel Plates (Subcommittee XI) (effective April 13, 1970)

The revision was to satisfy criticisms of SCNDT of ASME Boiler Code Committee.

A 588 - 69 (formerly A 588 - 68), Specification for High-Strength Low-Alloy Structural Steel with 50,000 psi Minimum Yield Point to 4 in. Thick (Subcommittee II) (effective July 18, 1969)

A new grade, Grade H (Kaisaloy 50 CR) was added.

A 588 - 70 (formerly A 588 - 69), Specification for High-Strength Low-Alloy Structural Steel with 50,000 psi Minimum Yield Point to 4 in. Thick (Subcommittee II) (effective April 13, 1970)

This revision eliminated modifications and made requirements more consistent, added a new grade as requested by Jones & Laughlin Steel Corp., and revised carbon requirement of Grade B as requested by Bethlehem Steel Corp.

A 589 - 70 (formerly A 589 - 68), Specification for Seamless and Welded Carbon Steel Water Well Pipe (Subcommittee IX) (effective Jan. 22, 1970)

The revision was to add a new sentence to Paragraph 9.2 as follows: "The hydrostatic pressure shall be maintained for not less than 5 s for all sizes of seamless and electric resistance welded pipe."

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Withdrawal of Standards:

- A 303 - 64, Specification for Hot-Rolled Carbon Steel Strip of Structural Quality (Subcommittee XIX) (effective June 12, 1970)

Replaced by A 570.

- A 415 - 64, Specification for Hot-Rolled Carbon Steel Sheets, Commercial Quality (Subcommittee XIX) (effective June 12, 1970)

Replaced by A 569.

- A 425 - 64, Specification for Hot-Rolled Carbon Steel Strip of Commercial Quality (Subcommittee XIX) (effective June 12, 1970)

Replaced by A 569.

Reapproval of Standards:

- A 3 - 64 (1970) Specification for Low-Carbon Steel Joint Bars (Subcommittee I)
A 4 - 64 (1970), Specification for Medium-Carbon Steel Joint Bars (Subcommittee I)
A 66 - 64 (1970), Specification for Steel Screw Spikes (Subcommittee I)
A 76 - 64 (1970), Specification for Low-Carbon Steel Track Bolts and Nuts (Subcommittee I)
A 243 - 64 (1970), Specification for Carbon and Alloy Steel Ring, Hollow Cylinder, and Disk Forgings for General Industrial Use (Subcommittee VI)
A 291 - 64 (1970), Specification for Carbon and Alloy Steel Forgings for Pinions and Gears for Reduction Gears (Subcommittee VI)
A 293 - 64 (1970), Specification for Carbon and Alloy Steel Forgings for Turbine Rotors and Shafts (Subcommittee VI)
A 294 - 64 (1970), Specification for Heat Treated Alloy Steel Forgings for Turbine Wheels and Disks (Subcommittee VI)
A 391 - 65 (1970), Specification for Alloy Steel Chain (Subcommittee XXVII)
A 413 - 65 (1970), Specification for Carbon Steel Chain (Subcommittee XXVII)
A 456 - 64 (1970), Specification for Magnetic Particle Inspection of Large Crankshaft Forgings (Subcommittee VI)

- A 462 - 64 (1970), Specification for Liquid Penetrant Inspection of Steel Forgings (Subcommittee VI)

- A 503 - 64 (1970), Specification for Ultrasonic Examination of Large Forged Crankshafts (Subcommittee VI)

- A 521 - 64 (1970), Specification for Steel Closed-Impression Die Forgings for General Industrial Use (Subcommittee VI)

- A 551 - 65 (1970), Specification for Steel Tires (Subcommittee VII)

ACTIVITIES OF SUBCOMMITTEES

Subcommittee I on Steel Rails and Accessories (G. G. Knupp, chairman) completed the task of revising and updating its twelve specifications. While all are highly current at this time, pending changes in the companion AREA rail specification have made it necessary to consider further revisions of Committee A-1 documents.

Subcommittee II on Structural Steel (J. R. LeCron, chairman) experienced, in 1969, a year of average activity. Elongation requirements in all our specifications were revised to reflect greater consistency and clarity. Two specifications were completely revised (A 131 and A 328). Additional steel types were approved for Specifications A 514 and A 588. Several changes and additions were made in our specification covering general requirements (A 6) to reflect present industry practice.

Subcommittee III on Steel Rod and Wire (V. I. Kelley, chairman) met in June and December. There are three active task groups all of which have met at least once. Task Group III-1 (Spring Wire Specifications, G. A. Sweitzer, chairman) has completely revised four specifications, A 227, A 228, A 229, and A 230. Currently, work on the other spring wire documents is in process along with a new proposal for Steel Wire, Carbon Spring for Heat-Treated Components. Task Group III-2 (General Requirements for Carbon Steel Hot-Rolled Wire Rods and Round Wire, H. A. Springer, chairman), has been working on an over-all revision of Specification A 510. Task Group III-3 (Heading Wire Specifications, J. M. Connard, chairman) has been actively engaged in general revision of six heading wire specifications. Present membership is 44: 21 producers, 16 consumers, and 7 general

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interest. Membership increased by two in the past year.

Subcommittee IV on Spring Steel and Steel Springs (J. E. Silvis, chairman) is presently revising five specifications within its jurisdiction, A 125, A 68, A 318, A 147, and A 552. A task force is also studying the need for specifications covering cold-wound springs.

Subcommittee V on Steel Reinforcement Bars (A. C. Weber, chairman) has been engaged in a complete review and updating of nine basic standards for reinforcing bars, steel wire, and prestressed strand for reinforced and prestressed concrete.

The results of extensive industry research has brought about more practical and proper evaluations for weight determination, yield strength, surface conditions for anchorage, and bend testing of all reinforcement.

A new grade of weldable steel for use in designs where field assembly and prefabrication of reinforcement is necessary has been developed and will shortly be included in the standards available for use under the provisions of the ACI Building Code to be issued late this year.

Higher yield strength material has been covered in all bar standards, and designations of plain and deformed wire as well as bars have been set up on the useful basis of cross-sectional area rather than the previous method of designation by gage number, which to the reinforced concrete designer and specifier, is meaningless.

The difficult task of correlating the useful features of standardization of reinforcement with the actual structural need of the steel product in its interaction with concrete, has been accomplished through the fine cooperation of consultant members from the concrete industry, the American Concrete Institute, the American Iron and Steel Institute, the Concrete Reinforcing Steel Institute, and numerous engineering school faculty members and researchers.

Subcommittee VI on Steel Forgings and Billets (G. T. Jones, chairman) has continued its activity in several areas in the past year. Five specifications were revised. One specification (A 468) has been discontinued. One new specification (A 604) covering etch tests on vacuum-arc remelt steel has been approved. There are four new specifications under preparation. To reduce the number of

active specifications, efforts are continuing to make combination specifications—in one case three existing specifications, and another case two existing specifications would be covered by two combination specifications. The Special Task Force on Large Rotor Forgings cooperative program on notch toughness and temper-embrittlement susceptibility of large rotor forgings has developed additional information in the past year. It expects to continue its activity in 1970. The Task Force on Method A 418, Ultrasonic Testing and Inspection of Turbine and Generator Steel Rotor Forgings, has prepared current information on this inspection and testing. It is expected the results will be a new and current revision of this specification covering large forgings.

Subcommittee VII on Steel Wheels and Tires for Railway Service (M. S. Riegel, chairman) was active during the year in developing a new specification for cast steel wheels for electric railway service. This specification has been approved by the Society. All specifications under jurisdiction of Subcommittee VII were reviewed during the year and either revised or updated as required.

Subcommittee VIII on Steel Castings (A. F. Gross, chairman) completed its work on the Method and Specification A 609, for Longitudinal Beam Ultrasonic Inspection of Carbon and Low-Alloy Steel Castings. A proposed specification covering special requirements for nuclear service and additions to Specification A 27 were sent to Committee A-1 for letter ballot. A task force reported on proposed changes to Recommended Practice A 488, and part of these recommendations were submitted for subcommittee ballot. Changes in Specification A 487, for Low Alloy Steel Casting Suitable for Pressure Service, were submitted to subcommittee ballot in an effort to satisfy the ASME Code and obtain Code acceptance of additional grades.

Subcommittee IX on Steel Pipe (W. E. Coleman, chairman) completed preparation of a new specification for tapered structural tubes (A 595). A significant revision was made in standard pipe specification, A 120, to provide requirements for pipe to be joined by soldering in plumbing and similar applications. The subcommittee approved a

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color coding system for certain types of pipe to permit ready identification in warehouse stocks. Extensive revision of Specification A 155, for Electric-Fusion-Welded Steel Pipe for High-Pressure Service, is being considered. The subcommittee is working actively with API on a newly formed joint API-ASTM Task Group on Line Pipe Specifications, which was established to coordinate efforts of these two standards bodies in this area.

Subcommittee X on Steel Tubing (W. R. Sylvester, chairman, replacing T. D. Parker) was active during 1969 in completing revisions to 22 specifications. These included extensive revisions to Specification A 426, for Centrifugally Cast Ferritic Alloy Steel Pipe for High Temperature Service, clarification of the scope clause size ranges as requested by the ASME-ASTM Liaison Committee, and modification of tempering temperatures so as to be consistent with ASME post-weld heat-treatment requirements. Work continues on the preparation of six new specifications: a supplementary specification for nuclear service (with Subcommittee IX), quenched and tempered 1½ in. chromium pipe, austenitic feedwater tubing, stainless water tubes, centrifugally cast carbon steel pipe, and welded steel tubing for refrigeration service. Significant progress has been made in the proposed revision of the nondestructive electric test requirement of Specification A 450 and the inclusion of Charpy V-notch impact specimens to Specifications A 333 and A 334. No progress has been made on the deletion of "XYZ" marking but it is hoped that a task force reviewing tubular-product hydrostatic test requirements (with Subcommittee IX) will recommend a basis for removing these provisions.

Subcommittee XI on Steel for Boilers and Pressure Vessels (W. B. Hoyt, chairman), during 1969, completed and submitted to Committee A-1 for letter ballot 26 items of business. Most of these were revisions to existing standards to clarify or otherwise improve their quality. Two were new specifications: Nickel-Cobalt-Molybdenum-Chromium Alloy Steel Plates, Quenched and Tempered for Pressure Vessels, and High-Strength Carbon Steel Plates for Pressure Vessels for Moderate- and Lower-Temperature Service. Among a number of items

whose consideration extends into 1970 are two of particular interest. One is the preparation of a new specification which will detail the supplementary requirements needed to certify steel plates for nuclear applications. The second is the preparation of an editorial manual which will outline the format for all specifications under the jurisdiction of Subcommittee XI.

Subcommittee XV on Bar Steels (H. E. Lunt, chairman, replacing G. A. Remley) has been active during 1969 writing new specifications and up-dating old specifications. Two new specifications were written and passed to the main committee to replace Specification A 306. Three tentative specifications were adopted as standard, and a revised version of Specification A 355 was submitted to Committee A-1 for action. A task force is at work developing specification revisions to meet the needs of the National Fluid Power Association for steel bars for pressure-containing components.

Subcommittee XVI on Steels for Security Applications (L. L. Wyman, chairman)—The former ad hoc committee was designated as an official subcommittee. G. W. Anderhold and D. B. Munro continued to serve as vice-chairman and secretary, respectively.

The subcommittee is working on a revision to Specification A 629 - 68, for Tool-Resisting Steel Flat Bars and Shapes for Security Applications. Having developed standards applicable to the primary materials for security applications, the subcommittee now intends to consider the possibility of standardizing certain assemblies and sub-assemblies.

Subcommittee XIX on Sheet Steel and Steel Sheets (M. Kosten, chairman, replacing J. D. Anderson) was active on many fronts during 1969. Five new specifications were approved and passed on to Committee A-1 for action, and one additional new specification was prepared by a task force for consideration by the subcommittee. One tentative specification was adopted as standard; three old specifications were discontinued, one because it was superseded by a new specification; the revision of two specifications are awaiting subcommittee action; and three others are being reviewed by task forces. In addition, a task force has undertaken a long-range project on the subject of

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transverse bend tests for structural quality sheets. Data are being accumulated from test results submitted by producing members.

Subcommittee XX on Tin Plate (W. J. Stewart, chairman) has submitted to letter ballot in the subcommittee specifications for Steel, Cold Rolled, Single and Double Reduced Electrolytic Chromium Coated. The necessary referee and control analytical methods for determining chromium, chromium oxides, and plate lubricant are being studied by a task force. Other task forces are working on testing procedures of special property tin plate, surface finish, double-reduced black plate, product descriptions, and sampling procedures. W. C. Stammer has accepted appointment as chairman replacing W. J. Stewart. E. G. Grab, Jr., will be consumer vice-chairman.

Subcommittee XXII on Valves, Fittings, Bolting and Flanges for High Temperature and Subatmospheric Temperatures (I. A. Rohrig, chairman) was active in each of the four sections and in the main committee during 1969. A considerable number of revisions were processed for bolting, castings, forgings, and welding fittings. Completion seems near for the specifications for Special Requirements for Nuclear and Other Special Applications following a number of task group sessions to resolve differences. Complete revisions are being made in Specifications A 234, A 403, and A 420 to make these specifications for steel pipe fittings suitable for Boiler Code approval. A poll conducted in the committee showed sentiment favoring a change in scope to provide for applications in the intermediate range of temperature.

Subcommittee XXVI on Bolting (W. R. Pressler, chairman) was active in 1969 working on revisions to Specifications A 563 and A 325. Specification A 325 was revised to include three types of high-strength bolts: Type I, medium-carbon steel; Type II, low-carbon martensite steel; and Type III, bolts having atmospheric corrosion resistance and weathering characteristics comparable to

Specifications A 588 and A 242 and weathering steels when used in bare-steel applications.

Subcommittee XXVII on Steel Chains (E. C. Hunter, chairman), has been very active during the year in both full subcommittee meetings and considerable correspondence. The activity in International Standards Organization (ISO/TC 111) through the American National Standards Institute (ANSI) has been very extensive. The subcommittee delegates attended two meetings during the year and reported the various actions for discussion and guidance. Subcommittee ballots were taken on three documents for ANSI's action to ISO. A proposed revision to the paragraph on elongation measurement was balloted by the subcommittee but negative votes have necessitated rewriting this section. Adoption of a satisfactory elongation section has held up revisions to Specifications A 454-64, A 466-64, and A 467-64. The subcommittee also voted to reapprove Specifications A 391-65 and A 413-65 without change.

Subcommittee XXIX on Tool Steels (B. E. Wright, chairman) concentrated its efforts toward the completion of the new Specification A 600, for High-Speed Tool Steel. Having finished this document, a proposed specification for hot-work tool steels was prepared. This proposal is being reviewed by the task group after letter ballot of the subcommittee. Simultaneously, data are being accumulated for the preparation of documents covering the other standards and working jointly with the Technical Committee on Tool Steel of the AISI the subcommittee expects to have standards for the high-alloy tool steels ready for review early in 1970.

Respectfully submitted on behalf of the committee,

A. O. SCHAEFER,
Chairman

R. C. GRIFFIN,
Secretary

REPORT OF COMMITTEE A-2 ON WROUGHT IRON

Committee A-2 on Wrought Iron held one meeting during the year at Atlantic City, N. J., on June 23, 1969.

In December 1969 the only producer of wrought iron in the United States, A. M. Byers Co., discontinued production of the product. Pending further developments in the next year, it is anticipated that the

ASTM specifications for wrought iron will be withdrawn.

Respectfully submitted on behalf of the committee,

L. S. CRANE,
Chairman

O. M. TISHLARICH,
Secretary

REPORT OF COMMITTEE A-4 ON IRON CASTINGS

Committee A-4 on Iron Castings held two meetings, at Haddon Hall, Atlantic City, N.J., on June 26, 1969, and at the Netherland-Hilton Hotel, Cincinnati, Ohio, on Dec. 11, 1969.

Committee A-4 is composed of 107 voting members classified 36 producers, 52 consumers, and 19 general interest.

Ralph Clark, chairman of Subcommittee P-1 of committee A-4 was awarded the Award of Merit at the 1969 Annual Meeting in Atlantic City.

The following committee members were elected, to the indicated positions, for two years, beginning at the close of the annual meeting, by letter ballot of the committee:

Chairman, D. F. Rundle.

Vice-chairman, T. Giszczak.

Secretary, Price Burgess.

For Executive Committee at Large: D. L. Crews, D. E. Krause, J. H. Lansing, G. Mannweiler, and J. S. Vanick.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee A-4 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which became effective on the dates indicated:

New Standard:

A 602-70, Specification for Automotive Malleable Iron Castings, (Subcommittee P-1) (effective March 6, 1970)

This specification incorporates current commercial practice for the production of automotive malleable iron castings.

Revision of Standards:

A 74-69 (formerly A 74-66), Specification

for Cast Iron Soil Pipe and Fittings, (Subcommittee P-2) (effective Dec. 19, 1969)

This specification was revised to incorporate current commercial practice and sizes for the production of cast iron soil pipe and fittings.

A 159-70 (formerly A 159-68), Specification for Automotive Gray Iron Castings (Subcommittee P-1) (effective March 6, 1970)

This specification was revised to incorporate current commercial practice for the production of automotive gray iron castings.

A 395-70 (formerly A 395-68), Specification for Ductile Iron for Pressure Containing Castings for Use at Elevated Temperatures (Subcommittee X-2) (effective May 29, 1970)

The table of dimensions for "Y" blocks was corrected.

A 436-70 (formerly A 436-63), Specification for Austenitic Gray Iron Castings (Subcommittee S-1) (effective May 29, 1970)

The table of dimensions for "Y" blocks was corrected.

A 439-70 (formerly A 439-62 (1968)), Specification for Austenitic Ductile Iron Castings (Subcommittee S-4) (effective May 29, 1970)

The paragraph on chemical analysis was modernized to incorporate current practice and the table of "Y" block dimensions was corrected.

A 445-70 (formerly A 445-66), Specification for Ferritic Ductile Iron Castings for Valves, Flanges, Pipe Fittings and Other Piping Elements (Subcommittee P-3) (effective May 29, 1970)

REPORT OF COMMITTEE A-4

The table of dimensions for "Y" blocks was corrected.

A 476 - 70 (formerly A 476 - 67), Specification for Ductile Iron Castings for Paper Mill Dryer Rolls (Subcommittee S-4) (effective May 29, 1970)

The table of dimensions for "Y" blocks was corrected and the paragraph on mechanical properties was clarified.

A 536 - 70 (formerly A 536 - 67), Specification for Ductile Iron Castings (Subcommittee S-4) (effective May 29, 1970)

The table of dimensions for "Y" blocks was corrected.

A 571 - 70 (formerly A 571 - 68), Specification for Austenitic Ductile Iron Castings for Pressure Containing Parts Suitable for Low-Temperature Service (Subcommittee S-4) (effective May 29, 1970)

Corrected the table of dimensions for "Y" blocks.

Reapproval of Standard:

A 436 - 63 (1970), Specification for Austenitic Gray Iron Castings (Subcommittee S-1)

The new and revised standard will appear in the 1971 *Annual Book of ASTM Standards*, Part 2.

AMERICAN NATIONAL STANDARDS

The following standard was approved during the year as an American National Standard by the American National Standards Institute:

A 220 - 68; ANSI G48.2-1970, Specification for Pearlitic Malleable Iron Castings

ACTIVITIES OF SUBCOMMITTEES

Subcommittee S-1 on Gray Iron Castings (Hugo Larson, chairman) is working on the reapproval of Specification A 48 - 64, for Gray Iron Castings.

Subcommittee S-2 on Malleable Iron Casting (Ted Giszczak, chairman) is working on the reapproval of Specification A 197 - 65, for Cupola Malleable Iron. The subcommittee is also working on the preparation of a specification to cover the patented magnesium inoculated malleable irons of The Jamestown Malleable Iron Division of the

Blackstone Corp. The committee is also monitoring Specification A 47 - 68, for Malleable Iron Castings, and Specification A 220 - 68, for Pearlitic Malleable Iron Castings.

Subcommittee S-3 on White Iron Castings (H. Ruf, chairman) is monitoring Specification A 532 - 67, for Abrasion-Resistant Irons. The subcommittee is also working on the development of a specification for centrifugally cast dual-metal (gray and white cast iron) cylinders for pressure containing parts for temperatures up to 450 F.

Subcommittee S-4 on Ductile Iron Castings (H. E. Henderson, chairman) is in the process of updating the following specifications for metric units and current ASTM form: Specification A 439 - 70, for Austenitic Ductile Iron Castings, Specification A 476 - 70, for Ductile Iron Castings for Paper Mill Rolls, Specification A 536 - 70, for Ductile Iron Castings, and Specification A 571 - 70, for Austenitic Ductile Iron Castings for Pressure Containing Parts Suitable for Low-Temperature Service.

Subcommittee P-1 on Automotive Castings (R. A. Clark, chairman) is monitoring the operation of the new Specification A 602 - 70, for Automotive Malleable Castings, and revised Specification A 159 - 70, for Automotive Gray Iron to determine if any further modifications are needed.

Subcommittee P-2 on Pipes and Tubes (A. H. Smith, chairman) is monitoring Specification A 74 - 69, for Cast Iron Soil Pipe and Fittings, Specification A 142 - 67, for Cast Iron Culvert Pipe, and Specification A 377 - 66, for Cast Iron Pressure Pipe.

Subcommittee P-3 on Pipe Fittings, Valves and Flanges (J. R. Cardwell, chairman) had a task group investigating the desirability of combining Specification A 126 - 66, for Gray Iron Castings for Valves, Flanges, and Pipe Fittings, with Specification A 278 - 64, for Gray Iron Castings for Pressure Containing Parts for Temperatures up to 650 F. Another task group is investigating the desirability of combining Specification A 445 - 70, for Ferritic Ductile Iron Castings for Valves, Flanges, Pipe Fittings, and other Piping Components, with Specification A 395 - 68, for Cast Ductile Iron for Pressure Containing Parts for Use at Elevated Temperatures.

REPORT OF COMMITTEE A-4

Subcommittee P-4 on Foundry Pig Iron (R. W. Carpenter, chairman) is monitoring Specification A 43 - 67, for Foundry Pig Iron.

Subcommittee T-1 on Testing (Price Burgess, chairman) is working on reapproval of Method A 256 - 65, Compression Testing of Cast Iron. The subcommittee also has a task group studying modifications to improve Methods A 327 - 68, Impact Testing of Cast Iron.

Subcommittee T-2 on Microstructure (G. B. Mannweiler, chairman) has a task group studying the subject of metallographic specimen preparation which will serve in an advisory capacity to subcommittee XIV of Committee E-4 in improving coverage of graphite-containing ferrous alloys by Methods E 3 - 62.

Subcommittee X-1 on Editorial Matters and Nomenclature (J. S. Vanick, chairman) has submitted a standard for Definition of Terms Relating to Iron Castings and three

defined terms to be added to the standard to ASTM for action by the interim procedure. The subcommittee also has a number of additional definitions in process.

Subcommittee X-2 on Temperature Effects (J. R. Katus, chairman) is working on reapproval of Specification A 278 - 64, for Gray Iron Castings for Pressure-Containing Parts for Temperatures up to 650 F and Specification A 319 - 65, for Gray Iron Castings for Elevated Temperatures for Non-Pressure Containing Parts.

Subcommittee X-3 on Corrosion (J. H. Lansing, chairman)—The Task Group on Atmosphere Exposure will be removing and evaluating the samples exposed for 12 years during 1970.

Respectfully submitted on behalf of the committee,

J. R. KATTUS,
Chairman

D. F. RUNDLE,
Secretary

REPORT OF COMMITTEE

A-5 ON METALLIC-COATED IRON AND STEEL PRODUCTS

Committee A-5 on Metallic-Coated Iron and Steel Products held two meetings during the year: on June 24 in Atlantic City N. J., and on December 2 in Pittsburgh, Pa. Subcommittee meetings were held at both places prior to the main committee meeting. Inspections were made at various test sites in the United States during the year.

On May 24, the committee consisted of 102 voting members, of whom 43 were classified as producers, 26 as consumers, and 33 as general interest. A survey of member classifications conducted in late 1969 resulted in the reclassification of 7 members. A membership campaign conducted in January 1970 resulted in 21 new members.

Clifford W. Straitor, past chairman of A-5 and past Director of the Society, received the Society's Award of Merit at the 1969 meeting for his long and meritorious service to Committee A-5 and to the Society.

During the year, William Tunney was appointed chairman of Subcommittee XIII on Metallic-Coated Hardware and Structural Shapes, replacing R. A. Munster, and J. E. Crowley was appointed chairman of Subcommittee XV, Exposure Tests on Wire, replacing J. B. Horton.

Officers elected for the ensuing two-year term are:

Chairman, William M. Barnum
First Vice-Chairman, Glen H. Foltz
Second Vice-Chairman, H. P. Raffensperger
Secretary, Vincent I. Kelly

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee A-5 submitted the following recommendations to the Society for action under the Interim Procedure for Standards,

which became effective on the dates indicated:

New Standard Specifications:

A 599 - 69, Steel Sheet, Cold-Rolled, Tin-Coated by Electrodeposition (Subcommittee XI) (effective Dec. 19, 1969)

Tin-coated sheets are made in sizes and thicknesses similar to terne-, zinc-, and aluminum-coated sheets and are marketed in like manner. Producers and consumers have requested a standard specification for tin-coated sheets.

A 603 - 70, Zinc-Coated Steel Structural Wire Rope (Subcommittee XII) (effective Feb. 27, 1970)

Industry needed a specification in this previously unspecified area.

Adoption of Tentative Specifications as Standard with Revisions

A 475 - 69 (formerly A 475 - 66 T), Zinc-Coated Steel Wire Strand (Subcommittee XII) (effective Sept. 19, 1969)

The tentative was found to be adequate with a few revisions and was adopted as standard on that basis.

Revision of Standard, Immediate Adoption:

A 90 - 69 (formerly A 90 - 66), Test for Weight of Coating on Zinc-Coated (Galvanized) Iron or Steel Articles (Subcommittee VII) (effective Nov. 14, 1969)

The revision resulted from a request from the field for clarification of A 90 with respect to coating weight terminology as applied to galvanized sheet and other galvanized articles.

A 121 - 69 (formerly A 121 - 66), Specification for Zinc-Coated (Galvanized) Steel

REPORT OF COMMITTEE A-5

Barbed Wire (Subcommittee XII) (effective Nov. 14, 1969)

During the meeting in Atlantic City, Jan. 29, 1968, Subcommittee XII was asked to revise Section 10 to conform to Specification A 585.

A 123 - 69 (formerly A 123 - 68), Specification for Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip (Subcommittee XIII) (effective Nov. 14, 1969)

Both producers and purchasers felt the need for inclusion of provisions relating to method to be used for determination of weight of coating on material manufactured without customer inspection at point of manufacture.

A 308 - 69 (formerly A 308 - 67), Specification for Steel, Sheet, Cold-Rolled, Long Terne-Coated (Subcommittee XI) (effective Nov. 14, 1969)

The revision was for the purpose of updating the format and adding metric equivalents.

A 446 - 69 (formerly A 446 - 67), Specification for Zinc-Coated (Galvanized) Steel Sheets of Structural Quality, Coils and Cut Lengths (Subcommittee XI) (effective Oct. 17, 1969)

Revision was needed to keep the standard up-to-date in respect to the state of the art.

A 463 - 69 (formerly A 463 - 67), Specification for Steel Sheet, Cold-Rolled, Aluminum-Coated Type 1 (Subcommittee XI) (effective Dec. 19, 1969)

There was a need to update the format of this standard, to add metric equivalents, and to add three new qualities of sheet (commercial, drawing, and physical). New coating designations resulted from partial resolution of a negative vote.

A 585 - 69 (formerly A 585 - 68), Specification for Aluminum-Coated Steel Barbed Wire (Subcommittee XII) (effective Nov. 14, 1969)

Since aluminum-coated barbed wire was a

product of commerce, it was felt that a standard was needed.

AMERICAN NATIONAL STANDARDS

The following standards have been approved during the year as American National Standards by the American National Standards Institute:

A 90 - 69; ANSI G8.12-1970, Methods of Test for Weight of Coating on Zinc-Coated (Galvanized) Iron and Steel Articles, Feb. 11, 1970

A 111 - 66; ANSI C7.31-1970, Specification for Zinc-Coated (Galvanized) "Iron" Telephone and Telegraph Line Wire, Jan. 20, 1970

A 121 - 69; ANSI G8.10-1970, Specification for Zinc-Coated (Galvanized) Steel Barbed Wire, Feb. 11, 1970

A 123 - 69; ANSI G8.1-1970, Specification for Zinc (Hot Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip, Feb. 11, 1970

A 308 - 69; ANSI G8.20-1970, Specification for Steel, Sheet, Cold-Rolled, Long Terne-Coated, Feb. 11, 1970

A 446 - 69; ANSI G8.27-1970, Specification for Zinc-Coated (Galvanized) Steel Sheets of Structural Quality, Coils and Cut Lengths, Feb. 11, 1970

A 392 - 68; ANSI G53.20-1970, Specification for Zinc-Coated Steel Chain-Link Fence Fabric, Feb. 11, 1970

A 475 - 69; ANSI C7.46-1970, Specification for Zinc-Coated Steel Wire Strand, Jan. 20, 1970

A 491 - 68; ANSI G53.21-1970, Specification for Aluminum-Coated Steel Chain-Link Fence Fabric, Feb. 11, 1970

ACTIVITIES OF SUBCOMMITTEES

Subcommittee VII on Methods of Testing (D. G. Watt, chairman) held two meetings during the year both in conjunction with the A-5 meeting. The revision of A 239 (Preece Test for Uniformity of Zinc Coating) proposed by the task group, to avoid misapplication and misinterpretation of this test method, was unacceptable to the subcommittee. The task group, therefore, has been requested to make further revisions to A 239 based on the criticisms accompanying nega-

REPORT OF COMMITTEE A-5

tive ballots and a further canvass of the membership for suggestions. The Task Group on the Application of Magnetic Gages has made an initial check on the accuracy and reproducibility of coating thickness measurements using five types of gages on hot-galvanized specimens in a statistically controlled program. This work is a necessary prelude to developing processing for assessing coating thickness on structural shapes using such gages.

Subcommittee XI on Sheet Specifications (C. W. Beattie, chairman) met twice during the year, both times in conjunction with the main committee meeting. The "General Requirement" specification, A 525, for all galvanized sheet specifications has been revised. One important change is the addition of coating designations for alloyed zinc coatings recognizing the large tonnages now being produced.

The Secretariat of a "working group" of "The International Organization for Standardization" (ISO) involving uncoated and galvanized steel sheet, is held by the USA. Members of Subcommittee XI are also members of the "working group" and are drafting galvanized sheet specifications for review at the International meeting to be held in Tokyo next fall.

Subcommittee XII on Wire Specifications (H. P. Raffensperger, chairman) held two meetings during the year, one in June at Atlantic City, and one in December at Pittsburgh. Because of reported industry interest for an ASTM standard covering general requirements for zinc-coated (galvanized) steel wire, the task group appointed to prepare such a standard has submitted Draft No. 6 which has been forwarded to the subcommittee membership for letter ballot. At the request of Society Headquarters, all standards under the jurisdiction of Subcommittee XII have been metricized. At the request of a member, the subcommittee is currently studying the section on "Joints" as covered in Specification A 459 - 66, for Zinc-Coated Flat Steel Armoring Tape. The question raised by the member concerns the mechanical properties of the welded area. The Task Group on Chain-Link Fence Fabric is currently studying a possible revision of the

wire size tolerances covered in Specifications A 394 - 68, for Zinc-Coated Steel Chain-Link Fence Fabric, and A 491 - 68, for Aluminum-Coated Steel Chain-Link Fence Fabric. This is a result of a suggestion by one of the members that a table showing minimum uncoated wire diameters be included in the standard.

Subcommittee XIII on Structural Shapes and Hardware Specifications (William Tunney, chairman) held two meetings during the year, both in conjunction with the main committee meeting. At the June meeting, Mr. Munster, long-time chairman of Subcommittee XIII, announced his resignation. At the Pittsburgh meeting, Mr. Tunney was assigned the duties of subcommittee chairman. Due to the change in command, the activity of Subcommittee XIII was restricted principally to administrative matters.

Subcommittee XIV on Sheet Tests (V. P. Pearson, chairman) made its annual inspections at test sites of the corrugated black and metallic-coated sheets. A report of the 1969 inspections is appended hereto. Resident inspectors on the West Coast inspected the site at Point Reyes. In addition to the inspections, the subcommittee held one meeting. Report of inspections appears in Appendix I.

Subcommittee XV on Wire Tests (J. E. Crowley, chairman) made its annual inspection of the exposure test programs for coated wire. Report of inspection appears in Appendix II. During the year, Dr. Horton was succeeded in the chairmanship of the subcommittee by J. E. Crowley.

Subcommittee XVI on Hardware Tests (W. F. Gerhold, chairman) made its annual inspections of the exposure test programs of coated hardware. Report of inspections appears in Appendix III.

Subcommittee XVII on ISO Specifications (N. B. Juster, chairman) is limited by activity of ISO in areas of interest to A-5. In the past year, there has been little ISO business requiring our attention.

Respectfully submitted on behalf of the committee,

W. M. BARNUM,
Chairman

S. K. COBURN,
Secretary

APPENDIX I

REPORT OF SUBCOMMITTEE XIV ON FIELD TESTS OF ATMOSPHERIC CORROSION OF METALLIC-COATED STEEL PANELS

The atmospheric corrosion tests of corrugated metallic-coated steel panels exposed in September, 1960, were inspected as shown below:

State College, Pa. April 22, 1969

Newark, N. J. April 23, 1969

Kure Beach (800-ft site), N. C. May 7, 1969

Brazos River (Freeport), Tex. September 23, 1969

Point Reyes, Calif. November 8, 1969

A summary of the inspection results is given in Table 1. At State College, one sheet, OL1, had developed a trace amount of yellow corrosion products since the last inspection in 1968. At Newark, two sheets, GL1, and OL1, showed 100 percent base metal rust at this inspection. At Kure Beach, in the 800-ft lot, four sheets, RP1, AP1, LL1, and OL1 showed a slight increase in the percentage of yellow corrosion products. At Brazos River, the inspection showed that one sheet, LL1, had developed a trace of yellow corrosion products. At Point Reyes, four sheets, EP1, LL1, BL2, and ML2 show traces of dark zinc-iron alloy since the last inspection.

The aluminum-silicon coated sheet, SA1, at State College, showed a slight increase in pinhole rust spots and there were no visible

changes on this material at the other four atmospheric test sites. The pure aluminum-coated sheet, TA1, did not show any visible changes since the 1968 inspections at four of the test sites. However, at Point Reyes, sheet TA1 showed some surface etching, primarily confined to "roll marks" parallel to the corrugations.

There has been very little change in the terne coated sheet, UT4, exposed at all of the test sites since the 1968 inspections. Only at Point Reyes is the terne coated sheet, UT4, 100 percent rust stained.

1926 PROGRAM

At the April 22, 1969, inspection of galvanized sheets at State College, two sheets in the 1.5 oz/ft² class, 22 gage, YCA, Bottom, and SCL, Top, had developed 100 percent rusting of the coating. Also, one sheet in the 1.25 oz/ft² foot class, 22 gage, had developed 100 percent rusting. One sheet, USB, uncoated, 22 gage, had disintegrated and fallen from the test rack. The revised tabulation of data is given in Table II.

Respectfully submitted on behalf of Subcommittee XIV,

VINCENT P. PEARSON,
Chairman

REPORT OF COMMITTEE A-5 (APPENDIX I)

TABLE 1 Atmospheric Corrosion of Corrugated Metallic-Coated Steel Panels
Exposed September 1960

Coating Type	Code	Average Coating Weight oz/ft ²	State College 8.6 yr	Newark 8.6 yr	Kure Beach 8.6 yr	Point Reyes 9.1 yr	Brazos River 9.0 yr
Galvanized-Pot	RP1	1.05	12% Y*	100% R	10% Y*	5% A*	TrY
Galvanized-Pot	EP1	1.40	TrY	99.9% R*	TrY	TrA*	G
Galvanized-Pot	AP1	1.03	25% Y*	100% R	12% Y*	TrA	1.0% Y*
Galvanized-Pot	JP2	2.40	TrA	3.0% R*	G	G	TrA
Galvanized-Pot	PP2	2.25	TrA	3.0% R*	G	G	TrA
Galvanized-Line	CL1	1.17	G	100% R	G	G	G
Galvanized-Line	GL1	1.21	G	100% R*	G	G	G
Galvanized-Line	IL1	1.19	1.0% A*	100% R	TrY	G	G
Galvanized-Line	LL1	1.02	TrY	100% R	0.5% Y*	TrA*	TrY
Galvanized-Line	OL1	1.06	TrY*	100% R*	3% Y*	TrA	TrY*
Galvanized-Line	QL1	1.15	TrA	100% R	G	TrA	G
Galvanized-Line	KL2	2.43	G	TrR	G	TrA	G
Galvanized-Line	HL2	2.13	G	30% R*	G	TrA	G
Galvanized-Line	BL2	2.02	G	10% R*	G	TrA*	TrA
Galvanized-Line	ML2	3.02	G	TrR	G	TrA*	G
Galvanized-Line	NL2	1.88	G	35% R*	G	TrA	TrA
Aluminum Silicon	SA1	0.92	60 phr*	See Note 1	E	Tr phr	Tr phr
Aluminum	TA1	1.39	No change	See Note 2	E	E*	
Terne	UT4	1.31	90% R*	1.0% R* phr has re- sulted in approx. 80% yellow staining	50% R* 90% rust stain- ing & severe phr	See Note 3 5% R* 100% rust staining	0.1% phr 6% R* 93% rust stain- ing & phr

* Change since 1969 report.

A—Zinc-iron alloy visible.

G—Continuous zinc surface covered with corrosion products of zinc.

E—Surface of coating etched.

Tr—Trace.

Y—Yellow corrosion products of alloy.

R—Base metal rust.

phr—Pinhole rust spots, surrounded by brown stain.

NOTE 1—Entire surface has a brownish-yellow cast which is visible through dirt film. A small crack has developed on this panel by the upper left bolt hole. Bottom center corrugation, mechanical damage.

NOTE 2—Entire surface has a grey-brown cast which is visible through dirt film. This panel is lighter in color than Panel SA.

NOTE 3—Surface etching, primarily confined to "roll marks" parallel to corrugations. No evidence of yellowing.

REPORT OF COMMITTEE A-5 (APPENDIX I)

TABLE 2 Life of Corrugated Galvanized and Black Sheets, 26 by 30 in.
Exposed at State College, Pa., on April, 23, 1926
Boldface numbers indicate changes since 1969 Report

Sheet ^b	No. 16 Gage, 2.5 oz./ft. ² ^a			No. 22 Gage, 2.5 oz./ft. ² ^a			No. 22 Gage, 2.0 oz./ft. ² ^a			No. 22 Gage, 1.5 oz./ft. ² ^a			No. 22 Gage, 1.25 oz./ft. ² ^a			No. 22 Gage, 0.75 oz./ft. ² ^a			No. 28 Gage, 0.75 oz./ft. ² ^a			No. 22 Gage, Uncoated		
	Years to			Years to			Years to			Years to			Years to			Years to			Years to			Years to		
	1st	100% Rust	Perforation	1st	100% Rust	Perforation	1st	100% Rust	Perforation	1st	100% Rust	Perforation	1st	100% Rust	Perforation	1st	100% Rust	Perforation	1st	100% Rust	Perforation	1st	100% Rust	Perforation
R (T)	24.0	*	*	26.0	*	*	19.0	*	*	17.5	*	*	14.5	36.0	*	c	c		c	c				
(B)	27.0	*	*	29.0	*	*	20.0	*	*	16.5	*	*	15.0	41.0	*	c	c		c	c				
V (T)	27.0	*	*	21.5	*	*	18.5	*	*	16.0	*	*	15.0	*	*	9.5	23.0	*	c	c				
(or U) (B)	24.0	*	*	23.0	*	*	25.0	*	*	15.5	*	*	16.5	40.0	*	10.5	24.0	*	c	c				
N (T)	c	*	*	20.5	*	*	22.5	*	*	17.5	*	*	12.0	36.0	*	6.5	20.5	*	11.0	23.0	*			
(B)	c	*	*	28.0	*	*	22.5	*	*	15.5	41.0	*	13.5	36.0	*	9.0	23.0	*	11.5	30.0	*			
T (T)	27.0	*	*	34.4	*	*	21.0	*	*	16.0	*	*	15.0	43.0	*	9.0	26.0	*	9.0	24.0	*			
(B)	31.0	*	*	39.0	*	*	23.0	*	*	14.5	40.0	*	13.5	34.4	*	10.5	22.5	*	12.0	25.0	*			
Y (T)	21.5	*	*	22.5	*	*	19.5	*	*	17.5	39.0	*	14.5	*	*	10.0	22.5	*	9.5	24.0	*			
(B)	22.5	*	*	29.0	*	*	19.0	*	*	18.5	43.0	*	14.5	29.0	*	10.5	30.0	*	13.0	26.0	*			
S (T)	22.0	*	*	28.0	*	*	25.0	*	*	19.0	43.0	*	14.5	32.0	*	10.5	21.5	*	11.5	22.0	*			
(B)	22.5	*	*	32.0	*	*	28.0	*	*	19.5	*	*	15.5	30.0	*	11.0	21.5	*	11.5	21.5	*			
C (T)	c	*	*	22.5	*	*	17.5	*	*	16.0	*	*	14.5	40.0	*	9.5	24.0	*	c	c				
(B)	c	*	*	34.4	*	*	21.5	*	*	18.5	*	*	14.5	30.0	*	10.0	24.0	*	c	c				
K (T)	23.0	*	*	25.0	*	*	22.5	*	*	17.5	38.0	*	14.5	31.0	*	11.5	24.0	*	10.5	23.0	*			
(B)	24.0	*	*	30.0	*	*	28.0	*	*	21.0	42.0	*	16.5	33.0	*	11.5	22.5	*	11.5	21.0	*			
W (T)	c	*	*	29.0	*	*	25.0	*	*	16.5	33.0	*	13.5	31.0	*	c	c		c	c				
(B)	c	*	*	36.0	*	*	28.0	*	*	15.0	35.0	*	14.5	30.0	*	c	c		c	c				
Average	24.6			28.7			22.5			17.1			14.6			10.0	23.5		11.1	24.0				

* Data not yet available. ^a Coating weight is oz./ft.² of sheet (both sides). ^b (T) = Corrugated sample from top of sheet on west side of rack with bottom surface upward. (B) = Corrugated sample from bottom of sheet on east side of rack with top surface upward. * There were no specimens exposed. ^c Reported as perforation rather than 100 percent rust in 1956 Proceedings. ^d Note—Panel C(T), 22 gage, 1.25 oz./ft.², top of sheet, west side of rack, has a hole on the 4th corrugation on the right side approximately 6 in. from the top. This hole is the result of mechanical damage and is not a perforation.

APPENDIX II

REPORT OF SUBCOMMITTEE XV ON ATMOSPHERIC EXPOSURE TESTS OF WIRE AND WIRE PRODUCTS

This report summarizes the results of the atmospheric corrosion tests on zinc-coated wire and wire products through 1969 after approximately 33 years of exposure. A summary report of the results of atmospheric corrosion tests on aluminum-coated wire and wire products that were exposed in 1961 is also included.

Reference to earlier reports of Committee A-5 on Corrosion of Iron and Steel, which appeared in the Society's *Proceedings* for 1939, 1941, 1943, 1945, 1947, 1949, 1951, 1953, 1955, 1957, 1961, and *STP 290*, will be helpful in studies of these data. These earlier reports contain descriptions of the

ucts, but copper-covered and lead-coated steel wires, and chromium and chromium-nickel steel wires, are also included. The coatings are expressed in weight terms of ounces per square foot of surface. For comparisons of coating thickness, 1 oz./ft² of surface may be considered as averaging 0.0017 in. thick for zinc coatings, 0.0013 in. thick for copper coatings, and 0.0010 in. thick for lead coatings.¹

Specimens of wires and wire products were exposed for up to approximately 33 years at eleven locations. The location of these sites and their general classification regarding atmospheres are as follows:

Test Locations	General Type of Atmosphere	Remarks
Pittsburgh, Pa. (abandoned 1951)	severe industrial	on Brunot Island in the Ohio River about 2 miles west of the city
Bridgeport, Conn. (abandoned 1962)	industrial	in the city
Sandy Hook, N. J. (abandoned 1952)	seacoast	about 300 yards from the Atlantic Ocean
Santa Cruz, Calif. (abandoned 1969)	rural (marine)	about 3 miles from the Pacific Ocean
State College, Pa.	rural	Central Pennsylvania
Lafayette, Ind.	rural	Wabash River Valley
Ames, Iowa	rural	Central Iowa
Manhattan, Kans.	rural	Kansas River Valley
Ithaca, N. Y.	rural	Central New York State
College Station, Tex. (abandoned 1967)	rural	about 120 miles inland
Davis, Calif. (abandoned 1965)	rural	about 80 miles inland

test methods, micrographs, and other characterizations of the specimens in the tests, as well as data assembled during previous inspections.

ZINC-COATED WIRE AND WIRE PRODUCTS TEST

The materials being tested are mostly bare and zinc-coated steel wires and wire prod-

ucts. After the 1969 inspection, the exposure site at Santa Cruz, Calif., had to be abandoned because the city of Santa Cruz needed the area for expanding recreational facilities. It was decided at that time to discard all remaining specimens and racks because the

¹The lead-coated wires in these tests were lead-coated over a bonding coat of zinc. See *Proceedings*, Vol 43, 1943, p. 87, for analysis of lead coatings.

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existing 30-year contract had expired and it would be too costly to relocate.

To date, six of the original eleven sites have been abandoned. In order to reduce the volume and repetition of tabulated data in the future, the detailed yearly inspection reports will be limited to the active exposure sites. Summary reports of Group Averages, however, will still include all exposure sites even though abandoned.

More than 900 specimens were exposed at each location. These include short lengths of wire (42 in. long) and wire strand at all locations, farm-field fence at nine sites, and barbed wire and chain-link fence at eight sites.

The extent of corrosion is being measured by visual examinations of all specimens at the test and by tension test on the wire specimens. The specimens at State College, Pa., were examined in the spring of 1969 by a traveling committee. Inspections at the other locations were made by the university personnel in charge of the exposure plots.

Findings from Visual Examinations for Corrosion

The condensed and summarized inspection records of corrosion through 1969 (approximately 33 years) are shown in Table 1 for wire specimens, wire strand, farm-field fence, chain-link fence, and barbed wire. This table shows the average number of years until first rust (IR) and until 100 percent rust (CR) appeared on all specimens of each group, or the average state of corrosion of the group.

In accordance with conventions used in the 20-year report of 1961², all observations relating to the condition of wires up to and including initial rusting will be found in column IR (Initially Rusted). All observations relating to the condition of wires after initial rusting will be found in column CR (Completely Rusted). To add separate columns for observations of the letter-designation types (M, G, MG, etc.) would make the tables unwieldy.

Findings from Tension Tests

There were originally about 840 tensile strength specimens exposed at each site. Ten-

sion tests are made only on the unfabricated wire specimens. These specimens are exposed in groups of seven taken from the same lot of wire and supposedly alike. An attempt is made to remove and test the first specimen of each group when it has been estimated to have lost 5 to 10 percent of its strength, and the seventh specimen, when it is estimated to have lost about 75 percent of its strength. The number of wires removed to date is shown in Table 2.

The results of the tensile strength tests of specimens removed during 1969 are shown in Table 3.

In accordance with conventions used in the 20-year report of 1961, %/YR is calculated on the basis of elapsed time after initial rusting. The 20-year report showed that the percent loss of breaking load increased linearly with years of exposure time, and the slopes (%/YR) could be readily calculated and presented.

ALUMINUM-COATED WIRE AND WIRE PRODUCTS

This test program was initiated in 1961 and involves aluminum-coated wire and wire products. These materials are exposed at seven test sites in the United States, and one in England. The eight test sites are listed below, and the locations are classified according to the type of atmosphere in accordance with the classification set forth in the 1958 Report of Advisory Committee on Corrosion.

Members of Subcommittee XV of Committee A-5 annually inspect the atmospheric exposure tests of wire and wire products under their jurisdiction. The examination of the exposure at Warrington, England, is made by a resident inspector.

In 1969, the specimens at Newark, N. J., were relocated from their original area in the exposure site to another area in the same plot because the owner of the property needed the land the site is located on for expanding facilities. By June 1970, this expansion will require the entire area now occupied by the exposure plot.

Arrangements are being completed with the Public Service Electric and Gas Co., Newark, N. J., to establish an exposure test site at their Kearny Generating Station, which is only a few miles from the present

²ASTM STP 290, Twenty-Year Atmospheric Corrosion Investigation of Zinc-Coated and Uncoated Wire and Wire Products by Fred M. Reinhart.

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Test Locations and Exposure Dates

Location	Type Atmosphere	Exposure Date
Unfabricated Wires and Fabricated Wire Products		
Kure Beach, N. C. (800-ft site)	marine	May 23, 1961
Newark, N. J.	industrial	June 12, 1961
State College, Pa.	rural	June 19, 1961
Warrington, England	industrial	March 1, 1964
Fabricated Wire Products Only		
Brazos River, Tex.	Gulf Coast	July 17, 1961
Kure Beach, N. C. (80-ft site)	marine	May 22, 1961
Manhattan, Kans.	rural	July 19, 1961
Point Reyes, Calif.	marine	July 21, 1961

Newark site. This move will present the formidable task of relocating all of the ASTM specimens, racks, frames, and other mounting services by June 1970.

Findings from Visual Examinations for Corrosion

The summarized inspection records of corrosion through 1969 (approximately 8 years, except Warrington which is 5 years) are shown in Tables A through E for unfabricated wire specimens, farm-field fence, barbed wire, chain-link fence, and 7-wire strand. This table shows the average number of years until first rust (IR) and until 100 percent rust (CR) appeared or the average state of corrosion of the group. Table F is a listing of the abbreviations and symbols used in the inspection report.

There is no inspection report for the ACSR core-wire specimens because of their mode of fabrication as a concealed component of the conductor specimens prohibiting their being visually inspected. An estimate of the relative corrosion resistance of the various ACSR core wires must await dismantling of the exposed specimens at a future time to be selected. In the meantime, the conductor specimens will be examined on a yearly basis

for any external signs of accumulated corrosion products inside the structure.

Reference to earlier reports of Committee A-5 on Metallic Coated Iron and Steel Products, which appear in the Society's *Proceedings* for 1964, 1967, and 1968, will be helpful in studies of these data. These earlier reports contain descriptions of test methods, micrographs, and other characterizations of specimens in this test.

Findings from Tension Tests

Tension tests are made only on the unfabricated wire specimens. Originally there were about 340 test specimens exposed at each of four sites in this test program. These unfabricated wire specimens are exposed in groups of twenty taken from the same lot of wire and are supposedly alike. Periodically wires are removed and tension tested in an attempt to determine any change in breaking strength as corrosion progresses. The number of wires removed to date is shown in Table G. The results of the tensile strength tests of specimens removed during 1969 are shown in Table H.

Respectfully submitted on behalf of Subcommittee XV,

J. E. CROWLEY,
Chairman

REPORT OF COMMITTEE A-5 (APPENDIX II)

TABLE 1 Report of Group Averages Through 1963—33 Years Exposure

Zinc-Coated Wire Test

Note—Abbreviations and symbols used to designate appearance or state of corrosion: M = metallic; G = gray; MG = intermediate between metallic and gray; GY = predominantly gray but showing indication of yellow; Y = yellowed or rust stained but not showing actual rough rust of base metal; R = rough rust of base metal; PHR = percentage; PHR, PHRY = rust or yellowed in pinholes; SR, SY = speckled appearance of rust or yellowing; Br, Gn = corroded to a brown or green appearance; B = black, D = dirt or not excluding a better observation; Tr = trace.

Zinc Coating Weight Group, Avg oz/ft ² of Surface	No. in Group	Average of Observed Years to Initial Rust (IR) Complete Rust (CR) or State of Corrosion																						
		Pittsburgh, Pa. ^f		Bridgeport, Conn. ^g		Sandy Hook, N. J. ^h		State College, Pa.		Lafayette, Ind.		Ithaca, N. Y.		Ames, Iowa		Manhattan, Kans.		College Station, Tex.		Santa Cruz, Calif. ^j		Davis, Calif. ^k		
		IR	CR	IR	CR	IR	CR	IR	CR	IR	CR	IR	CR	IR	CR	IR	CR	IR	CR	IR	CR	IR	CR	
Unfabricated Wires																								
0.20 to 0.29.....	0.27	10	0.7	1.3	2.1	3.0	1.9	2.9	4.6	6.1	4.4	5.7	5.8	6.8	6.2	7.8	10.0	17.5	7.8	12.9	12.4	17.1	13.2	99.9R
0.30 to 0.39.....	0.34	7	1.3	1.7	2.6	3.5	2.7	3.3	6.1	7.7	5.2	6.6	6.9	8.0	7.8	10.3	10.0	21.3	10.8	17.9	15.4	21.5	94R	
0.40 to 0.49.....	0.45	11	1.6	2.3	3.4	4.9	3.4	4.7	7.4	9.4	6.5	8.4	8.2	10.0	10.2	14.3	21.5	96R	13.8	23.1	19.5	81R	28R	
0.50 to 0.59.....	0.56	8	1.8	2.4	4.6	5.8	4.5	5.8	9.1	11.5	8.1	9.8	9.9	11.4	11.7	16.4	40R	72R	20R	20R	20R	20R	20R	
0.60 to 0.69.....	0.65	11	2.0	2.6	5.6	6.8	6.0	6.9	10.8	13.4	9.3	11.2	11.2	12.8	14.1	18.9	33R	50R	50R	50R	50R	50R	50R	
0.70 to 0.79.....	0.74	8	2.2	2.8	5.5	7.3	5.6	7.1	10.9	14.0	9.6	12.0	11.5	13.8	14.9	20.1	27R	31R	31R	31R	31R	31R	31R	
0.80 to 0.89.....	0.83	9	2.5	3.2	6.0	8.0	6.0	7.5	11.5	15.4	9.7	13.5	11.9	15.1	17.8	23.5	33R	10.7	32R	32R	32R	32R	32R	
0.90 to 1.10.....	0.96	5	2.9	3.7	7.2	9.6	7.9	9.6	14.4	18.9	12.3	16.3	15.0	17.7	96R	4R	4R	11R	11R	11R	11R	11R	11R	
1.20 to 1.60.....	1.34	3	3.6	5.0	9.3	12.2	10.2	12.3	21.0	99R	18.0	24.0	19.4	24.2	24R	MG	MG	MG	MG	MG	MG	MG	MG	
1.60 to 2.10.....	1.76	10	4.2	5.7	12.0	16.9	15R	15R	67R	78R	78R	78R	24.5	94R	G	G	G	G	G	G	G	G	G	
2.20 to 3.00.....	2.86	3	7.3	8.4	21.0	23.4	G	G	GY	GY	G	G	SR	SR	G	MG	MG	G	G	G	G	G	G	
Copper-covered—8.33.....		2	D		Gn	Gn	Gn	Gn	Gn	Gn	Gn	Gn	Gn	Gn	Gn	Gn	Gn	Gn	Br	Br	Gn	Gn	Gn	
Lead-covered—1.62.....		4	0.97	D	1.46	D	0.93	100	1.3	100	2.0	73	1.9	60R	11.4	61R	15.3	30R	2.6	27	0.83	7R	1.9	
12-14% Cr-cold drawn.....		3	D	SR ^e	D ^e	G ^e	Y,SR	G	G	G	G,SR	G,SR	22.9	24	G,SR	6R	6R	4.8	73R	17.8	7R	88SR	17.8	
12-14% Cr-air quenched.....		3	D	SR ^e	D ^e	G ^e	Y,SR	G	G	G	G	G	G	G	G,SR	M	M	4.8	33R	40SR	MG	MG	MG	
15% Cr-5% Ni.....		4	D ^d		G ^e		MG	M	M	M	M	M	M	M	MG	M	M	16SY	16SY	16SY	16SY	16SY	16SY	

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Wire Strand

0.99 to 0.93.....	4	3.9	7.1	9.8	15.8	0.1	66R	19.3	99R	15.5	99R	10.9	28.4	GY	GY	Y, 1R	GY	GY	10R, 46SR
1.00 to 1.20.....	3	4.9	7.3	11.7	17.8	10.9	42R	27.0	71R	17.0	93R	10.9	98R	GY	GY	Y, 1R	GY	GY	
1.30 to 1.60.....	3	5.9	10.2	15.1	20.1	13.6	25R	27.0	93R	10.0	72R	10.6	98R	GY	GY	Y, 1R	GY	GY	
1.70 to 2.50.....	2	7.2	12.2	22.4	26.0	G	2R	2R	13R	13R	75	1.0	95R	MG, Y	GY	1.83	40	13R, 46SR	
Lead-coated.....	1	0.97	D ₂	1.43	D ₂	0.93	100	0.84	32.4	3.1	PHR	PHR	PHR	13R	5.9	69	PHR	PHR	

Chain Link Fence

0.29 to 0.52.....	3	1.5	2.2	2.4	5.3	1.9	4.8	6.0	9.7	5.7	9.3	5.9	11.9	no speci- mens ex- posed	no speci- mens ex- posed	no speci- mens ex- posed	12.8	GY	67R
1.13 to 1.22.....	2	3.8	4.9	8.9	12.5	8.5	10.9	15.9	22.3	14.0	22.0	17.9	24.4	G, 1R	G, 3R	G, 3R	12.8	GY	15R
2.09 to 2.32.....	2	6.5	8.2	19.5	25.0	G2R	12.5	G, 1R	10.7	85R	10.6	97R	18.8	90R	97R	18.8	GY, 1R	25R	
1.40 to 1.97.....	10	3.6	6.9	9.8	13.9	8.0	GY	30.3	90R	30.3	90R	19.9	31.0	G, 1R	G, 1R	G, 1R	12.8	GY	
4.21 ⁶	1	7.5	11.9	19.5	21.4	G	GY	30.3	90R	30.3	90R	19.9	31.0	G, 1R	G, 1R	G, 1R	12.8	GY	
Copper-covered	1	Gn ⁶	Gn	Gn	Gn	Gn	100	R & Y	100	R & Y	100	PHR	M	Gn, SR	Gn	Gn	25.7	Gn, Br	3R, 33SR
Lead-covered...	1	1.48 ⁶	35R	4.9	D, 5R	1.44	G	1.85	45R	6.0	70	PHR	M	Gn, SR	Gn	Gn	25.7	Gn, Br	
18% Cr-8% Ni...	1	D ⁶	D ⁶	MG	MG	G	G	M	M	M	M	M	M	M	M	M	MG	MG	

Farm Field Fence

0.02 to 0.39.....	5	No speci- mens ex- posed	no speci- mens ex- posed	no speci- mens ex- posed	no speci- mens ex- posed	no speci- mens ex- posed	no speci- mens ex- posed	no speci- mens ex- posed	no speci- mens ex- posed	no speci- mens ex- posed	no speci- mens ex- posed	no speci- mens ex- posed	no speci- mens ex- posed	no speci- mens ex- posed	no speci- mens ex- posed	no speci- mens ex- posed	no speci- mens ex- posed	no speci- mens ex- posed	no speci- mens ex- posed	no speci- mens ex- posed
0.30 to 0.39.....	9	0.27	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
0.40 to 0.49.....	10	0.47	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51
0.50 to 0.59.....	3	0.60	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
0.60 to 0.69.....	9	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61
0.70 to 0.79.....	7	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
0.80 to 0.89.....	5	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
0.90 to 0.99.....	6	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
1.70 to 1.90.....	3	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78	1.78
2.70 to 2.80.....	2	2.73	2.73	2.73	2.73	2.73	2.73	2.73	2.73	2.73	2.73	2.73	2.73	2.73	2.73	2.73	2.73	2.73	2.73	2.73
Copper-covered	1																			
Lead-covered...	1																			
12-14% Cr-sold drawn.....	1																			
12-14% Cr-air quenched.....	1																			
18% Cr-8% Ni...	1																			

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TABLE 1-Continued

Zinc Coating Weight Group, Δ lbs/19 of Surface	No. in Group	Average of Observed Years to Initial Rust (IR) Complete Rust (CR) or State of Corrosion																							
		Pittsburgh, Pa. ^f		Bridgeport, Conn. ^g		Sandy Hook, N. J. ^h		State College, Pa.		Lafayette, Ind.		Ithaca, N. Y.		Ames, Iowa		Manhattan, Kans.		College Station, Tex. ⁱ		Santa Cruz, Calif. ^j		Davis, Calif. ^k			
		IR	CR	IR	CR	IR	CR	IR	CR	IR	CR	IR	CR	IR	CR	IR	CR	IR	CR	IR	CR	IR	CR		
Barbed Wire																									
0.24 to 0.28.....	4	no specimens exposed	no specimens exposed	no specimens exposed	4.9	6.4	4.8	7.0	6.8	8.0	7.3	10.2	11.4	10.6	7.6	18.1	12.8	20.3	15.3	24.8					
0.37 to 0.46.....	3				6.5	9.2	6.7	9.7	7.0	11.3	11.3	15.5	21.4	18.5	18.5	18.5	18.5	71R	20.5	4R					
0.50 to 0.70.....	4				12.0	15.4	9.8	14.0	10.0	16.7	15.6	23.6	G, 19R	24.4	29R	29R	29R	GY, 8R	3R	GY					
0.82 to 0.97.....	3				16.7	21.0	12.6	23.0	18.6	24.5	25.5	70R	GY, 2R	5R	5R	5R	5R	GY	GY	GY					
1.52 to 1.64.....	2				20.9	45R	14.5	70R	16.9	33R	50R	MG, 5R	MG, 5R	10R	10R	10R	10R	GY, 8SR	G	G					
1.95 to 2.00.....	4				G, 4R	42R	42R	47R	47R	14R	14R	14R	14R	3R	3R	3R	3R	GY	G	G					
Copper-covered	1				23.3	5R	Gn	Gn	Gn	Gn	Gn	Gn	Br	Br	Br	Br	Gn, Br	Gn, Br	Br	Br					
Lead-covered...	1				3.5	16R	2.0	35	1.9	60R	11.0	40R	19.6	60	1.83	30	1.9	60SR	1.9	24SR					
								PHR	PHR					PHR	PHR	PHR	PHR								

- ^g Coated before weaving.
^h Coated after weaving.
ⁱ Pitted and rough underneath black coat.
^j Few scattered pits underneath black coat.
^k Discontinued after 10 years exposure.
^l Site abandoned in 1951 after 13.0 years exposure.
^m Site abandoned in 1952 after 25.5 years exposure.
ⁿ Site abandoned in 1952 after 14.4 years exposure.
^o Site abandoned in 1957 after 30.1 years exposure.
^p Site abandoned in 1957 after 32.8 years exposure.
^q Site abandoned in 1958 after 28.8 years exposure.

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TABLE 2 Number of Specimens Removed for Tensile Strength Tests
Zinc-Coated Wire Test

Exposure Site	Number of Wires Removed in 1969						Total Removed to Date
	Base Steel	Zinc-Coated	Copper-Coated	Lead-Coated	Corrosion-Resistant Steels	Total	
Pittsburgh, Pa.	0	0	0	0	0	0	771
Sandy Hook, N. J.	0	0	0	0	0	0	462
Bridgeport, Conn.	0	0	0	0	0	0	844
State College, Pa.	2	68	2	4	0	76	406
Ithaca, N. Y.	9	57	2	3	0	71	341
Lafayette, Ind.*	0	0	0	0	0	0	365
Ames, Iowa	3	55	2	3	0	63	240
Manhattan, Kans.	0	21	0	0	0	21	130
College Station, Tex.	0	0	0	0	0	0	589
Davis, Calif.	0	0	0	0	0	0	567
Santa Cruz, Calif.	10	16	2	4	0	32	150
Total	24	217	8	14	0	263	4865

* Wires requested have not been received.

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TABLE 3 Breaking Loads of Wires Removed During 1969, After Approximately 33 Years of Exposure
Zinc-Coated Wire Test

Wire Lot No.	Years Exposure Since IR*	Original Breaking Load, lb	Breaking Load, lb	Loss, Percent	%/Yr	Wire Lot No.	Years Exposure Since IR*	Original Breaking Load, lb	Breaking Load, lb	Loss, Percent	%/Yr
State College, Pa. (32.4 Years)											
510	26.7	500	134	73.2	2.7	335	24.4	1040	663	36.3	1.5
511	27.7	280	67	76.1	2.7	336	22.1	760	486	36.1	1.6
512	27.9	320	80	75.0	2.7	337	22.7	860	579	32.7	1.4
520	26.1	280	115	58.9	2.3	338	20.4	1020	670	34.3	1.7
521	25.6	270	101	62.6	2.4	345	21.6	890	575	35.4	1.6
522	24.9	500	158	68.4	2.7	346	19.9	1070	723	32.4	1.6
530	21.1	310	102	67.1	3.2	347	19.1	860	599	30.3	1.6
531	23.4	500	161	67.8	2.9	348	13.8	980	639	34.8	2.5
540	19.4	300	117	61.0	3.1	350	2.7	640	574	10.3	3.8
541	21.9	350	144	58.9	2.7	351	12.1	970	820	15.5	1.3
542	21.9	510	182	64.3	2.9	215	28.8	1200	854	28.8	1.0
543	22.6	300	135	55.0	2.4	216	26.7	1630	1182	27.4	1.0
410	27.9	570	282	50.5	1.8	217	26.9	1080	798	26.1	1.0
411	26.9	630	316	49.8	1.9	225	24.4	1650	1223	25.9	1.1
412	26.7	840	437	47.9	1.8	227	23.7	1640	1170	28.7	1.2
421	26.1	470	253	46.2	1.8	228	24.6	1080	827	23.4	1.0
422	25.6	500	318	36.4	1.4	235	21.4	1680	1030	38.7	1.8
423	26.6	400	208	48.0	1.8	236	19.4	1270	1017	19.9	1.0
430	23.7	780	444	43.0	1.8	237	23.7	1540	1205	21.8	0.9
431	24.7	880	448	49.1	2.0	238	23.1	1650	1238	25.0	1.1
432	21.4	510	264	48.2	2.3	239	22.1	1120	857	23.5	1.1
440	22.7	590	312	47.1	2.1	245	21.6	1570	1228	21.8	1.0
441	21.6	520	283	45.6	2.1	246	18.1	1190	1007	15.4	0.9
442	19.4	470	237	49.6	2.6	247	20.1	1790	1370	23.5	1.2
443	21.9	750	415	44.7	2.0	248	19.2	1450	1068	26.3	1.4
444	21.1	570	329	42.2	2.0	252	3.8	1150	965	16.1	4.2
495Cr	18.4	750	441	41.2	2.2	296Cr	17.1	1570	1248	20.5	1.2
302	32.4	1110	570	48.6	1.5	125	25.1	1840	1485	19.3	0.8
305	32.4	1070	589	45.0	1.4	138	21.9	1960	1638	16.4	0.7
315	28.8	890	540	39.3	1.4	139	23.4	1920	1538	19.9	0.9
316	26.7	1110	710	36.0	1.3	148	19.1	2550	2078	18.5	1.0
317	25.6	780	520	33.3	1.3	149	20.6	1910	1598	16.3	0.8
325	24.6	730	507	30.5	1.2	800	10.2	2670	2260	15.4	1.5
326	25.9	700	423	39.6	1.5	801	14.5	1820	1170	35.7	2.5
327	24.4	1160	753	35.1	1.4	021	...	1640	1598	2.6	...
329	25.1	720	456	36.7	1.5	022	...	2320	2250	3.0	...
040	21.1	1790	1667	6.9	0.3	042	21.1	670	574	14.3	0.7
041	21.1	1070	973	9.1	0.4	043	21.1	300	229	23.7	1.1
Ithaca, N. Y. (32.8 Years)											
501	32.8	500	174	65.2	2.0	444	20.7	570	391	31.4	1.5
506	32.8	520	175	66.3	2.0	450	11.2	820	640	22.0	2.0
507	32.8	590	208	64.7	2.0	451	6.1	510	423	17.1	2.8
510	26.8	500	200	60.0	2.2	495Cr	20.2	750	513	31.6	1.6
511	26.8	280	112	60.0	2.2	302	32.8	1110	722	35.0	1.1
512	26.8	320	129	59.7	2.2	305	32.8	1070	752	29.7	0.9
520	25.8	280	157	43.9	1.7	315	27.7	890	653	26.6	1.0
521	25.0	270	140	48.1	1.9	317	25.5	780	594	23.8	0.9
522	25.0	500	226	54.8	2.2	325	23.8	730	592	18.9	0.8
530	21.1	310	146	52.9	2.5	326	25.0	700	525	25.0	1.0
531	23.4	500	250	50.0	2.1	327	24.5	1160	860	25.9	1.1
540	19.9	300	159	47.0	2.4	329	24.8	720	549	23.8	1.0

REPORT OF COMMITTEE A-5 (APPENDIX II)

TABLE 3—Continued

Wire Lot No.	Years Exposure Since IR ^a	Original Breaking Load, lb	Breaking Load, lb	Loss, Percent	%/Yr	Wire Lot No.	Years Exposure Since IR ^a	Original Breaking Load, lb	Breaking Load, lb	Loss, Percent	%/Yr
Ithaca, N. Y. (32.8 Years)—Continued											
541	17.9	350	186	46.9	2.6	335	23.3	1040	795	23.6	1.0
542	17.9	510	242	52.5	2.9	336	21.9	760	571	24.9	1.1
543	17.9	300	163	45.7	2.6	337	22.4	860	664	22.8	1.0
551	3.7	540	419	22.4	6.1	345	21.5	890	636	28.5	1.3
400	32.8	470	313	33.4	1.0	346	19.2	1070	816	23.7	1.2
401	32.8	440	255	42.0	1.3	347	17.9	860	681	20.8	1.2
405	32.8	470	273	41.9	1.3	348	14.2	980	767	21.7	1.5
406	32.8	460	296	35.7	1.1	350	5.0	640	562	12.1	2.4
410	27.3	570	370	35.1	1.3	351	16.2	970	854	12.0	0.7
411	26.8	630	439	30.3	1.1	352	6.8	1340	1174	12.4	0.8
412	26.8	840	526	37.4	1.4	215	27.3	1200	1005	16.3	1.6
421	25.5	470	299	36.4	1.4	217	25.8	1080	913	15.5	0.6
422	25.3	500	347	30.6	1.2	226	24.0	1150	964	16.2	0.7
423	25.8	400	268	33.0	1.3	227	22.5	1640	1358	17.2	0.8
430	22.5	780	530	32.1	1.4	235	21.6	1680	1147	31.7	1.5
431	24.0	880	568	35.5	1.5	250	12.1	1380	1303	5.6	0.5
432	21.4	510	355	30.4	1.4	251	9.6	1940	1822	6.1	0.6
440	22.5	590	393	33.4	1.5	252	6.1	1150	1018	11.5	1.9
441	20.0	520	362	30.4	1.5	282	25.3	1320	1058	19.8	0.8
442	20.4	470	289	38.5	1.9	800	13.0	2670	2403	10.0	0.7
443	22.2	750	505	32.7	1.5	801	16.0	1820	1263	30.6	1.9
021	...	1640	1663	-0.1	...	041	30.9	1070	1027	4.0	0.1
022	...	2320	2307	0.6	...	042	30.9	670	640	4.5	0.2
040	30.9	1790	1775	0.8	...						

Ames, Iowa (32.7 Years)

510	25.3	500	355	29.0	1.1	338	14.2	1020	958	6.1	0.4
511	26.5	280	195	30.4	1.1	345	13.7	890	801	10.0	0.7
512	27.2	320	230	28.1	1.0	346	13.4	1070	993	7.2	0.5
520	25.4	280	236	15.7	0.6	247	17.1	860	823	4.3	0.3
521	23.8	270	236	12.6	0.5	202	32.7	1640	1400	14.6	0.4
522	23.1	500	409	18.2	0.8	215	27.2	1200	1115	7.1	0.3
530	19.6	310	253	18.4	0.9	216	25.0	1630	1493	8.4	0.3
531	20.7	500	413	17.4	0.8	217	25.0	1080	963	10.8	0.4
541	14.4	350	310	11.4	0.8	225	19.1	1650	1543	6.5	0.3
542	18.7	510	463	9.2	0.5	226	20.1	1150	1082	5.9	0.3
405	32.7	470	355	24.4	0.7	227	20.4	1640	1545	5.8	0.3
410	27.2	570	457	19.8	0.7	228	21.8	1080	1038	3.9	0.2
411	26.0	630	545	13.5	0.5	235	13.6	1680	1290	23.2	1.7
412	26.0	840	678	19.3	0.7	236	16.0	1270	1437	-13.1	-0.8
421	24.8	470	406	13.6	0.5	239	18.2	1120	1038	7.3	0.4
422	23.9	500	437	12.6	0.5	245	14.6	1570	1517	3.4	0.2
423	25.0	400	341	14.8	0.6	246	15.7	1190	1162	2.4	0.2
431	21.0	880	779	11.5	0.5	247	13.6	1790	1467	18.0	1.3
440	16.7	590	557	5.6	0.3	282	23.8	1320	1232	6.7	0.3
441	20.0	520	489	6.0	0.3	296Cr	13.1	1570	1547	1.5	0.1
442	16.0	470	409	13.0	0.8	115	27.4	2690	2533	5.8	0.2
443	19.0	750	709	5.5	0.3	125	22.8	1840	1712	7.0	0.3
444	13.4	570	527	7.5	0.6	127	20.3	2540	2425	4.5	0.2
495Cr	14.3	750	673	10.3	0.7	135	15.7	2560	2513	1.8	0.1
302	32.7	1110	850	23.4	0.7	148	13.9	2550	2457	3.6	0.3
325	21.1	730	710	2.7	0.1	021	...	1640	1633	0.4	...
326	21.6	700	638	8.9	0.4	022	...	2320	2278	1.8	...
327	20.4	1160	1058	8.8	0.4	040	21.7	1790	1822	-1.8	-0.1

REPORT OF COMMITTEE A-5 (APPENDIX II)

TABLE 3—Continued

Wire Lot No.	Years Exposure Since IR*	Original Break-ing Load, lb	Break-ing Load, lb	Loss Percent	%/Yr	Wire Lot No.	Years Exposure Since IR*	Original Break-ing Load, lb	Break-ing Load, lb	Loss Percent	%/Yr
Ames, Iowa (32.7 Years)—Continued											
329	22.0	720	656	8.9	0.4	041	21.7	1070	1048	2.1	0.1
335	20.0	1040	970	6.7	0.3	042	21.7	670	669	0.1	...
336	20.7	760	688	9.5	0.5	043	8.6	300	310	-3.3	-0.4
337	21.4	860	819	4.8	0.2						
Manhattan, Kans. (32.8 Years)											
511	22.4	280	266	5.0	0.2	317	11.3	780	785	-0.6	...
512	22.3	320	300	6.3	0.3	325	10.3	730	750	-2.7	-0.3
520	17.1	280	283	-4.6	-0.3	326	10.8	700	691	1.3	0.1
521	22.7	270	280	-3.7	-0.2	216	21.9	1630	1620	0.6	...
522	31.3	500	515	-3.0	-0.1	228	11.6	1080	1065	1.4	0.1
411	22.0	630	629	0.2	...	282	11.8	1320	1348	-2.1	-0.2
412	18.9	840	803	4.4	0.2	115	23.9	2690	2632	2.2	0.1
421	20.8	470	455	3.2	0.2	117	23.9	2230	2147	3.7	0.2
422	12.4	500	481	3.8	0.3	125	13.0	1840	1807	1.8	0.1
423	16.4	400	381	4.8	0.3	127	10.3	2540	2613	-2.9	-0.3
431	9.7	880	832	5.5	0.6						
Santa Cruz, Calif. (32.8 Years)											
501	32.8	500	160	68.0	2.1	421	15.0	470	414	11.9	0.8
506	32.8	520	145	72.1	2.2	422	14.6	500	449	10.2	0.7
507	32.8	590	26	95.6	2.9	423	14.6	400	349	12.8	0.9
510	20.0	500	324	35.2	1.8	300	32.8	730	455	37.7	1.1
511	20.0	280	172	38.6	1.9	302	32.8	1110	605	45.5	1.4
512	20.3	320	186	41.9	2.1	305	32.8	1070	680	36.4	1.1
520	20.0	280	215	23.2	1.2	216	19.4	1630	1490	9.4	0.5
521	14.1	270	226	16.3	1.2	217	20.0	1080	1023	5.3	0.3
522	13.6	500	423	15.4	1.1	115	21.0	2690	2465	8.4	0.4
400	32.8	470	225	52.1	1.6	117	20.0	2230	2050	8.1	0.4
401	32.8	440	210	52.3	1.6	021	...	1640	1679	-2.4	...
405	32.8	470	241	48.7	1.5	022	...	2320	2338	-0.8	...
406	32.8	460	240	47.8	1.5	040	32.0	1790	1827	-2.1	-0.1
410	20.0	570	415	27.2	1.4	041	32.0	1070	1078	-0.7	...
411	20.0	630	494	21.6	1.1	042	32.0	670	677	-1.0	...
412	20.0	840	636	24.3	1.2	043	32.0	300	286	4.7	0.1

* Years exposed after initial rust (IR).

REPORT OF COMMITTEE A-5 (APPENDIX II)

TABLE A Years to Initial Rust (IR) and Complete Rust (CR) or State of Corrosion^a Through 1969 (Approx. 8 Years) for Unfabricated Wires (Average of 20)

1961 Exposure of Aluminum-Coated Wire and Wire Products

Wire No. and Coating			Kure Beach, N. C. 800 ft		Newark, N. J.		State College, Pa.		Warrington, England ^{b,c}	
No.	Coating	Gage	oz./ft. ²	IR	CR	IR	CR	IR	CR	IR
1	steel ^d	9	bare	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	Zn	9	0.60	5.0	99R	3.0	3.9	2.8	3.8	2.8
3	Zn	9	0.99	G, tr PPR		5.9	6.9	4.7	4.7	4.7
4	Zn	9	2.84	G, we		G, tr PP blk		MG		MG
5	Al	9	0.62	MG		mo rg, blk		mo, s		mo, s
6	Al	9	0.54	MG		mo rg, blk		mo, s		mo, s
8	Al	9	2.44	MG		G, tr PPR		mo, seat		mo, seat
9	Al	9	0.48	MG		rg, blk		pox		pox
10	Al	9	0.51	MG		rg, blk		mo, s, seat		mo, s, seat
11	Al	9	0.27	8.0	MG, 2 PPR	blk		pox		pox
12	Al	9	0.48	G, we (h), tr PPR		mo rg, blk		mo, s		mo, s
13	Al	9	0.63	MG		G, tr rg		4.7		4.7
17	Al	12½	0.29	G, we (h), PPY		blk, s (vh)		mo, s seat		mo, s seat
18	Al	12½	0.43	G, we (h), PPY		mo rg, blk		pox		pox
20	Al	12½	0.37	GY		mo rg, blk		4.7		4.7
21	Al	12½	1.76	G		G, s		mo, s, trR		mo, s, trR
22	Al	12½	3.36	G, we		G, s		mo, s, trR		mo, s, trR

^a See Table F.

^b Exposed in 1964.

^c Through 1968, report for 1969 not received.

^d Copper-bearing steel 9 gage (0.1483 in. dia.).

REPORT OF COMMITTEE A-5 (APPENDIX II)

TABLE B Years to Initial Rust (IR) and Complete Rust (CR) or State Corrosion^a Through 1969 (Approx. 8 Years)
for Farm-Field Fence
1961 Exposure of Aluminum-Coated Wire and Wire Products

No.	Coat- ing	Fence No. and Coating			Brasos River, Tex.		Kure Beach, N. C. 80 ft		Kure Beach, N. C. 800 ft		Manhattan, Kans.		Newark, N. J.		Point Reyes, Calif.		State College, Pa.		Warrington, England ^c	
		Wire Item	Gage	oz/ft ²	IR	CR	IR	CR	IR	CR	IR	CR	IR	CR	IR	CR	IR	CR	IR	CR
24	Zn	top	9	0.49	3.2	7.1	3.0	6.3	5.0	7.3	G		3.0	3.9	we(h)		6.9	5R	1.8	3.8
		line	11	0.42	1.2	7.1	2.0	7.3	4.0	87R	G		3.0	4.9	6.3	G,we PPR	7.9	5R	1.8	3.8
		stay	11	0.36	2.2	7.1	2.0	7.3	4.0	7.3	G		1.9	4.9	G,we		6.9	60R	1.8	3.8
		bottom	9	0.49	4.2	95R	4.0	7.3	GY		G		5.9	6.9	G,we		Y		1.8	3.8
25	Zn	wraps	...	...	2.0	7.1	1.0	7.3	5.0	84R	G		3.0	4.9	G,we		5.9	25R	1.8	3.8
		top	9	1.00	GY		2.0	80R	5.0	50R	m		4.9	6.9	we		G		3.8	3.8
		line	9	1.00	GY	4.0	4.0	64R	7.9	1PPR	M		4.9	6.9	PPR,		G		3.8	4.7
		stay	9	0.99	GY,		4.0	70R	5.0	23R	M		4.9	90R	6.3	10R	G		3.8	3.8
26	Al	bottom	9	1.00	GY	7.3	2.0	15R	G		M		6.9	95R	we,rg		G		3.8	30R
		wraps	...	...	GY	2.0	2.0	60R	7.3	2R	M		5.9	50R	we		G		3.8	3.8
		top	9	0.43	G,we,		moG(h)		we(h)		M		blk		we(h)		G		mo,s	
		line	11	0.38	PPR	Y,irPPR	moG(h)		GY		M		blk		scat		G,		mo,s	
26	Al	stay	11	0.27	2.2	99R	6.3	50R	GY		M		blk		PPY		G,		mo,s	
		bottom	9	0.43	G,PPR		moG		MG		Y		M,rg		8.3	5PHR	G,		mo,s	
		wraps	...	...	3.2	50R	6.3	98R	Y,we		4.0	R&Y	blk		we(h)		G,		mo,s	
															6.3	PPR	7.9	1R	0.8	4.7

^a See Table F. ^b Exposed in 1964. ^c Through 1968, report for 1969, not received.

REPORT OF COMMITTEE A-5 (APPENDIX II)

TABLE C Years to Initial Rust (IR) and Complete Rust (CR) or State of Corrosion^a Through 1963 (Approx. 8 Years) for Lynan 4-Point Barbed Wire
1961 Exposure of Aluminum-Coated Wire and Wire Products

Wire No. and Coating				Brazos River, Tex.		Kure Beach, N. C. 30 ft		Kure Beach, N. C. 800 ft		Manhattan, Kans.		Newark, N. J.		Point Reyes, Calif.		State College, Pa.		Warrington, England ^{d, e}	
No.	Coat- ing	oz/lb ^a	Gage	Wire Item	IR	CR	IR	CR	IR	CR	IR	CR	IR	CR	IR	CR	IR	CR	
27	Zn	0.43	12½	line	1.2	7.1	4.0	7.3	4.0	8.0	G	3.0	3.9	G		5.9	10R	2.8	3.8
				barb	1.2	6.3	1.2	7.3	2.0	7.3	G	1.9	3.9	occ PPR, PPY		5.9	7.9	0.8	3.8
28	Zn	0.97	12½	line	6.3	40R	4.0	80R	6.3	10PPR	M	4.9	6.9	4.2	10R	G		3.8	4.7
				barb	1.2	73R	1.0	80R	6.3	60R	M	3.9	6.9	4.2	20R	G		0.8	3.8
29	Al	0.25	12½	line	7.1	100 R & Y	7.3	15R	7.3	3R	M	blk		5.3	10PHR	moGY, PPR	pox(h)		
				barb	1.2	6.3	1.2	8.0	2.0	90R	M	blk		1.2	20R	moGY, R(end)	0.8	pox(h) R(end)	
30	Al	0.42	12½	line	6.3	3R	moG, we(h)		7.3	moGY, IPPR	M	blk		we(l), PPY		moGY, PPR	mo, s		
				barb(Al)	G		G		G		M	blk		M		we(h), PPY		G	mo, s
31	Al	0.39	12½	line	6.3	35R & Y	6.3	moG(h) 3PPR	7.3	3R	M	blk		we(h), PPY		moGY,	mo, s, seat pox		
				barb(Al)	G		G	we(h)		M		M		blk		M		G	mo, s, seat pox

^a See Table F. ^b Exposed in 1964. ^c Through 1963, report for 1960 not received.

REPORT OF COMMITTEE A-5 (APPENDIX II)

TABLE D Years to Initial Rust (IR) and Complete Rust (CR) or State of Corrosion* Through 1969 (Approx. 8 Years)
for Chain-Link Fence

1961 Exposure of Aluminum-Coated Wire and Wire Products

Fence No. and Coating				Braos River, Tex.		Kure Beach, N.C. 80 ft		Kure Beach, N.C. 800 ft		Manhattan, Kans.		Newark, N.J.		Point Reyes, Calif.		State College, Pa.		Warrington, England ^{d,e}
No	Coat- ing	Gage	Wire Item	IR	CR	IR	CR	IR	CR	IR	CR	IR	CR	IR	CR	IR	CR	
32	Zn	9	1.27 bars links knuckles	we,PPR we,PPR we,XY	we(vh) 4.0 5.0	25R 25R 25R	15R 28R ...	6.3 5.0 buried	G G G	GY 6.9 G(partialy buried)	30R we we(h) PPR,PPY we	G moG, blk G, blk	90Y 4.7 90Y	90Y 4.7 90Y	90Y 4.7 90Y	90Y 4.7 90Y	90Y 4.7 90Y	
33	Zn	9	2.81 bars links knuckles	we,PPR we,Y, PPR we,PPR	buried 7.3 7.3 7.3	... 10R 10R	3PPR 2PPR ...	7.3 7.3 buried	G G G	GY GY G(partialy buried)	we we we	G G, blk G, blk	90Y 80Y 80Y	90Y 80Y 80Y	90Y 80Y 80Y	90Y 80Y 80Y	90Y 80Y 80Y	
34	Zn	9	1.53 bars	8.2	2PPR	buried	5R	7.3	G trR(ends)	5.9	95R we,PPY	G	MG, R(ends)	MG, R(ends)	MG, R(ends)	MG, R(ends)	MG, R(ends)	
35	Zn	9	2.23 bars	G	buried	...	...	we	G	GY	we	G	MG, R(ends)	MG, R(ends)	MG, R(ends)	MG, R(ends)	MG, R(ends)	
36	Al	9	0.57 bars links knuckles	GY GY G	buried G 6.3	35R 25R 20R	...	we,G buried buried	G G M	G,XY G rg,blk rg rg	we,G we R(ends) we(I) PHblk R(ends)	G G G G G	mo,s mo,s mo,s	mo,s mo,s mo,s	mo,s mo,s mo,s	mo,s mo,s mo,s	mo,s mo,s mo,s	
37	Al	9	0.44 bars	G	buried	...	20R	2.0	8.1	blk	20R (type)	G	mo,s mo,s mo,s	mo,s mo,s mo,s	mo,s mo,s mo,s	mo,s mo,s mo,s	mo,s mo,s mo,s	seat post

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TABLE D—Continued

38	Al	0	0.64	links	G	8.0	mo, G PFR	mo, Mg M	M	blk	wo	G	mo, s
				knuckles	GY	7.3	mo- GY, GPR	M	M	blk	R(ends)	G	mo, s rg(h), seat, por
				barbs links	G GY	buried mo, G	...	7.3 mo, GY	M M	blk mo, rg, blk	R(ends) wo	G G	mo, s mo, s
				knuckles	G	7.3	3R	buried	M	mo, rg, blk	wo, dk	G	mo, s

* See Table F. * Exposed in 1944. * Through 1948, report for 1949 not received.

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TABLE E Years to Initial Rust (IR) and Complete Rust (CR) or State of Corrosion through 1969 (Approx. 8 Years) for 7-Wire Strand

1961 Exposure of Aluminum-Coated Wire and Wire Products

Strand No.	Size, in.	Coating	oz./ft ²	Brazos River, Tex.		Kure Beach, N. C. 80 ft		Kure Beach, N. C. 800 ft		Manhattan, Kans.		Newark, N. J.		Point Reyes, Calif.		State College, Pa.		Warrington, England ^a	
				IR	CR	IR	CR	IR	CR	IR	CR	IR	CR	IR	CR	IR	CR	IR	CR
39	3/8	Zn	0.99	GY	7.3	we(h) 12PPR		G		G		6.9	30R	6.9	we(h) 5PPR	G		MG	
40	3/8	Zn	2.98	GY	we(h) moG			G		G		G, we		G, we		G		MG	
41	3/8	Al	0.43	G, PPR				M		M		rg, blk		we (vh), PPR		moG, trPPR		MG	
42	5/16	Al	0.33	G, PPR	moG			M		M		rg, blk		we(h), trPPR		G, trPPR		mo, s	
43	3/8	Al	0.49	7.1	moG, trPPY			MG		MG		rg, blk		8.3	rg, Scat R	moG, trPPR		mo, s	
44	3/8	Al	4.54	we	MG			M		M		G, s		we		G		mo	
45	3/8	Al	2.26	G	MG			M		M		G, s		we		G		mo	
59	5/16 drawn	Al	0.39	10Y, PPR	8.0	moG, IR		G		G		mo rg, blk		we, Y		GY, 1PPR		mo, rg(m)	

^a See Table F. ^b Exposed in 1964. ^c Through 1968, report for 1969 not received.

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TABLE F Aluminum-Coated Wire Test—Abbreviations and Symbols Used in Tables A through E

M—metallic	l—light
G—gray	m—medium
MG—intermediate between "metallic" and gray	h—heavy
GY—predominantly gray but showing indication of yellow	vh—very heavy
Y—yellowed or rust stained but not showing actual rough rust of base metal	tr—trace
R—rough rust of base metal	occ—occasional
rg—reddish gold discoloration	scnt—scattered (more extensive than occasional)
mo—mottled-various shadings of gray	PP—pinpoint < $\frac{1}{8}$ in. in diameter
e—etch-loss of metallic brightness	PH—pinhead > $\frac{1}{8}$ in. in diameter
blk—black surface discoloration	10, 30, 50 etc.—percentage of surface
s—soil-dark or dirty accumulation adhering to test specimens	bal—balance
wc—white corrosion product	mech—mechanical damage

TABLE G Aluminum Coated Wire Test—Number of Specimens Removed for Tensile Strength Tests

	Number of Wires Removed in 1969				Total Removed to Date
	Base Steel ^a	Zinc-Coated	Aluminum-Coated	Total	
800-ft lot, Kure Beach, N. C.	1	1	0	2	2
Newark, N. J.	1	2	0	3	3
State College, Pa.	1	0	0	1	1
Warrington, England ^b	0	0	0	0	0
Total	3	3	0	6	6

^a Copper-bearing steel, 9 gage (0.1483 in. diameter).

^b 1969 inspection report and wires not received.

TABLE H Aluminum-Coated Wire Test—Breaking Loads of Wires Removed During 1969 After Approximately 8 Years of Exposure

Wire Lot No.	Years Exposed Since IR ^a	Original Breaking Load, lb	Breaking Load, lb	Loss, Percent	%/Yr	Wire Lot No.	Years Exposed Since IR ^a	Original Breaking Load, lb	Breaking Load, lb	Loss, Percent	%/Yr
800-ft Lot, Kure Beach, N. C.											
1 ^b	8.0	1723	1353	21.5	2.7	2	3.0	1487	1023	31.2	10.5
State College, Pa.											
1 ^b	7.9	1723	1490	13.5	1.7	...	...	...	...	...	...
Newark, N. J.											
1 ^b	7.9	1723	1448	16.0	2.0	2	2.9	1487	1065	28.4	10.0
3	1.9	1058	962	9.1	4.9	...	...	...	...	...	...

^a Years since initial rust (IR).

^b Uncoated copper-bearing steel.

APPENDIX III

REPORT OF SUBCOMMITTEE XVI ON FIELD TESTS OF ATMOSPHERIC CORROSION OF HARDWARE

1929 AND 1958 PROGRAM

This report covers the 1969 inspections of the 1929 program at State College, Pa., and the 1958 program at Newark, N. J. (New York area) and Kure Beach, N. C. (80 and 800-ft sites).

1929 PROGRAM

In the 1929 *ASTM Proceedings* (Vol 29, Part 1) the report states that the erection of the specimens at five exposure sites was completed by the third week in January 1929. The first report of inspections is shown in the 1931 *ASTM Proceedings* (Vol 31, Part 1, p. 184). However the exact dates of the early inspections are not indicated, only the weeks of exposure. The last report on all specimens is shown in the 1938 *ASTM Proceedings* (Vol 38, p. 90).

Racks were rebuilt and specimens were remounted by Nov. 16, 1942. Only those specimens which appeared to merit further testing were retained. Arrangements of specimens are shown in the 1943 *ASTM Proceedings* (Vol 43, p. 74) and the first report on the remounted specimens is given in the 1946 *ASTM Proceedings* (Vol 46, p. 158). The last reports of the discontinued test sites appear in the following *ASTM Proceedings*: 1944 (Vol 44, p. 92)—Altoona and Pittsburgh (Brunot Island), Pa., and 1952 (Vol 52, p. 118)—Sandy Hook, N. J., and Key West, Fla.

The hardware specimens remaining from the 1929 program were inspected on a very rainy day on April 22, 1969. The data from the inspection at State College, Pa., are shown in Table 1. Since the report in the 1964 *ASTM Proceedings* (Vol 64, p. 166) the arrangement within the table has been changed to facilitate comparison of similar items with various coatings.

Changes are very minor since the last reported inspection in 1967; however, the hot-dip galvanized knock-out boxes show 5R or more rust for the first time. Each value reported is a composite of as many as three individual specimens; therefore, changes cannot be compared from one report to another to compute differences quantitatively for any single specimen.

The environment at State College, Pa., is not considered an aggressive one from the corrosion standpoint. The exposure program is maintained because there are samples with different types of coating which have been exposed for a great length of time and their performance with regard to coating failure is desired.

1958 PROGRAM

Details including preparation of specimens, basic metal compositions, coating procedure, individual coating thickness, and microscopical examinations are in the 1959 *ASTM Proceedings* (Vol 59, p. 133). Tabulations of the ranges and averages of thicknesses are condensed for all sets of specimens in the 1960 *ASTM Proceedings* (Vol 60, p. 116).

The specimens for this test program were prepared to meet a specified coating thickness of 2.0 to 2.5 mils which was established by the subcommittee to keep the exposure time to a reasonable length. A table in the 1961 *ASTM Proceedings* (Vol 61, p. 156) shows the weight loss data for uncoated panels of six of the basis steels removed from the three sites after approximately a two-year exposure. Weight loss data on the second set of uncoated specimens removed after approximately six years are contained in a table in the 1965 *ASTM Proceedings* (Vol 65, p. 130). The remaining uncoated specimens were removed in 1968 after approximately

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a ten-year exposure. Weight loss data for these specimens are given in Table 2 of this report.

Newark Site

The inspection at Newark, N. J., was performed on a clear, warm day on April 23, 1969. The specimens were dry. The data taken are reported in Table 3 for 144 specimens.

The hot-dip zinc (Code 5) specimens reported with varying amounts of yellow and rust total 84 in 1969, the same since 1965. Specimens exhibiting 5R or more rust total 50 in 1969 as compared with 40 in 1968, 25 in 1967, and 18 in 1966. The general surface appearance of the flat and bent steel panels is dark to yellow, while the round specimens are gray to yellow. The flat panels of nodular and malleable iron are gray to yellow.

Some of the hot-dip aluminum (Code 6) specimens show a trace of yellow at the edge or hole. One hot-dip aluminum (Code 7) specimen continues to show a trace of yellow on the surface. The general appearance of both hot-dip aluminum (Code 6 and 7) specimens is rough and gray with black pinheads on the flat and bent panels. Round specimens are dark gray and dirty for both codes.

The electroplated zinc (Code 8) specimens reported in 1969 total 45, the same since 1967. All exhibit 5R or more rust compared with 45 in 1968, 42 in 1967, 29 in 1966, and 7 in 1965. Rounds continue to show the greater percentage of rust. The surfaces, at areas where there is no rust, are gray.

The sprayed zinc (Code 9) specimens show traces of yellow and rust at the various drilled holes. The sprayed aluminum (Code 10) specimens exhibit no rust. The overall appearance of both Code 9 and 10 specimens is bright with pinheads of dirt.

Kure Beach, 800-ft Site

The inspection at Kure Beach, N. C., was performed on a hot sunny day on May 7, 1969. The specimens were dry. There is no appreciable increase in the number of specimens exhibiting edge rust. As noted in 1966, edge rust is only on the east or seaward edge of the panels which face south. Details of the 1969 inspection appear in Table 4 for 147 specimens.

The hot-dip zinc (Code 5) specimens reported in 1969 total 53 compared with 45 in 1968 and 42 in 1967. The general surface appearance is gray-mottled white.

The hot-dip aluminum (Code 6) specimens reported in 1969 total 53 compared with 52 in 1968, and 41 in 1967. The general surface appearance is mottled-gray metallic.

The hot-dip aluminum (Code 7) specimens continue to exhibit the most advanced rust at this location. Thirty-eight specimens are reported in 1969 as compared with 36 in 1968, 33 in 1967, and 23 in 1966. Specimens exhibiting 5R or more rust total 19, the same as in 1968. Seventeen specimens were reported in 1966 and 1967. All specimens other than those reported exhibiting rust have a medium gray surface appearance.

Three electroplated zinc (Code 8) specimens continue to show a trace of rust at the edge on the seaward side. The general surface appearance of all Code 8 specimens is blue-gray.

The sprayed zinc (Code 9) and the sprayed aluminum (Code 10) specimens show a metallic appearance. Code 10 specimens continue to show staining around the holes.

Kure Beach, 80-ft Site

This site was inspected on a hot sunny day on May 8, 1969. All specimens were dry. Edge rust is reported on 56 specimens compared with 19 in 1968 and 14 in 1967. Specimens at this site face the ocean. Details are given in Table 5 for 249 specimens.

The hot-dip zinc (Code 5) specimens reported in 1969 total 84 the same as in 1967. The general appearance is light gray with yellow and red rust spots.

The hot-dip aluminum (Code 6) specimens reported in 1969 total 61 compared with 33 in 1968 and 25 in 1967. The general appearance is dull gray.

The hot-dip aluminum (Code 7) specimens reported in 1969 total 58 compared with 44 in 1968 and 36 in 1966. The general appearance of the specimens where there is no rust is dull gray.

The electroplated zinc (Code 8) specimens reported this year total 45 compared with 44 reported in 1967 and 1968. The general appearance of the specimens where there is no rust is blue gray.

Sprayed zinc (Code 9) and sprayed alumi-

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num (Code 10) specimens were not exposed at this site.

SUMMARY

The total number of specimens reported as indicating rust or staining has increased from 476 in 1968 to 530 in 1969. Of the 1030 coated specimens placed on test in 1958, 51.6 percent are listed in this report and summarized as follows:

Specimens Reported in 1969

Code	Newark		Kure—800 Ft		Kure—80 Ft	
	Total	5R or More	Total	5R or More	Total	5R or More
5	84	50	53	0	84	48
6	5	0	53	3	61	0
7	1	0	38	19	58	19
8	45	45	3	0	45	29
9	0	0	0	0	...	...
10	0	0	0	0	...	...
Total	135	95	147	22	248	96

Respectfully submitted on behalf of Subcommittee XVI,

WILLIAM F. GERHOLD,
Chairman

NOTE—See pages 95 and 96 for the rearranged version of the text of the 1969 Report of Subcommittee XVI.

REPORT OF COMMITTEE A-5 (APPENDIX III)

TABLE 1 Report of Inspection on Hardware Specimens at State College, Pa. 1929 Program

Inspected: April 22, 1969. Exposed: January, 1929. Exposed Period: 40.3 years.

NOTE—Abbreviations and Symbols: 0 = no rust; 5, 10, 25, 100 = approximate percentages; R = rusting of base metal; Y = yellow or orange appearance; R* = rust spots widely distributed; N = not exposed; Tr = trace.

Coating	3 by 3 by $\frac{5}{16}$ -in. Angles				$2\frac{1}{2}$ by $1\frac{1}{2}$ by $\frac{5}{16}$ -in. Angles			
	Plain Steel		Cu-Bearing Steel		Plain Steel		Cu-Bearing Steel	
	Mils ^a Thick	Condition	Mils ^a Thick	Condition	Mils ^a Thick	Condition	Mils ^a Thick	Condition
Hot-dip galvanized	4.28	5R-5Y ^a	4.90	5R-5Y ^a	5.51	TrR-5Y	4.68	TrR-TrY
Hot-dip aluminum	3.56	0	3.82	0	3.00	0	2.00	0
Electric sherardized	2.35	100R ⁱ	2.45	100R ^h	N	N	N	N
Lead plated	...	90R ^d	...	85R ^d	...	85R ^c	...	60R ^d

Coating	$1\frac{1}{2}$ by $1\frac{1}{2}$ by $\frac{1}{8}$ -in. Angles				$\frac{1}{4}$ by 3-in. Flats			
	Plain Steel		Cu-Bearing Steel		Plain Steel		Cu-Bearing Steel	
	Mils ^a Thick	Condition	Mils ^a Thick	Condition	Mils ^a Thick	Condition	Mils ^a Thick	Condition
Hot-dip galvanized	5.37	10R-10Y ^a	5.44	TrR-10Y	4.23	TrR-15Y	4.54	TrR-10Y
Hot-dip aluminum	3.56	0	4.44	0	3.60	0	2.64	0
Electroalvanized	N	N	N	N	N	N	1.12	100R ^h
Lead-plated	...	80R ^d	...	70R ^c	...	85R ^c	...	85R ^c

Coating	No. 14 by $\frac{1}{2}$ in. Cu-Bearing Steel Flats		No. 792 Window Frame Sections		Tower Clamps			
					Malleable Iron		Cast Iron	
	Mils ^a Thick	Condition	Mils ^a Thick	Condition	Mils ^a Thick	Condition	Mils ^a Thick	Condition
Hot-dip galvanized	5.44	5R-25Y ^p	4.42	5R [*]	3.40	75R-25Y ^k	4.05	10R-85Y ^o
Hot-dip aluminum	1.88	0	5.56	0	12.64	0	10.64	0
Lead-plated	...	40R ^a	N	N	N	N	N	N

Coating	1-in. Tubular Goods		2-in. Tubular Goods		$\frac{3}{4}$ -in. Nipples and Elbows			
					Malleable Iron		Cast Iron	
	Mils ^a Thick	Condition	Mils ^a Thick	Condition	Mils ^a Thick	Condition	Mils ^a Thick	Condition
Hot-dip galvanized	3.11	50R-50Y ^q	4.27	TrR-40Y	3.09	40R-60Y ^m	2.45	40R-60Y ^m
Hot-dip aluminum	7.32	0	18.92	0	12.80	0-rTH ^r	11.20	0-rTH ^r
Electric sherardized	1.56	100R ^o	N	N	1.28	65R-35Y ⁱ	N	N
Electroalvanized	2.75	10R-5Y ^a	2.69	75R ^b	2.72	90R-10Y ^j	2.13	90R-10Y ^j
					4.47	15R ^j	3.72	15R-15Y ^o
Gas sherardized	1.22	100R ^o	1.12	100R ^j	N	N	N	N
Amaloy	...	90R ^c	N	N	...	90R ^c	...	100R ^c
Calorized	...	TrR-100Y	N	N	N	N	N	N
Lead-plated	...	65R ^d	...	100R ^c	N	N	N	N

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TABLE 1—Continued

Coating	Forged Steel Tower Fittings		Knock Out Boxes		Bulldog Clamps	
	Mils ^a Thick	Condition	Mils ^a Thick	Condition	Mils ^a Thick	Condi- tion
Hot-dip galvanized	2.60	85R-15Y ^k	2.65	5R-95Y ⁱ	N	
	4.54	10R-85Y ^e				
Hot-dip aluminum	...	0	7.36	0	5.40	TrR
Electric sherardized	0.85	95R-5Y ^h	0.48	50R-50Y ⁿ	N	
Amaloy	N		...	95R ²	N	

^a Equivalent coating thickness for zinc and aluminum coating weight, based on mathematical calculations, are as follows: zinc, 1 oz/ft² = 1.7 mils; aluminum, 1 oz/ft² = 4.0 mils.

^b Rust around mechanical damage on specimen 64g. 5R or more rust first noted during inspection after.

^c (1929) 0.31 yr of exposure. ⁱ (4-27-56) 27 yr of exposure.

^d (1929) 0.83 yr of exposure. ^m (4-24-57) 28 yr of exposure.

^e (1930) 1.8 yr of exposure. ⁿ (4-21-59) 30.3 yr of exposure.

^f (1938) 9.4 yr of exposure. ^o (4-19-60) 31.3 yr of exposure.

^g (4-29-43) 14.1 yr of exposure. ^p (4-30-62) 33.3 yr of exposure.

^h (10-10-44) 15.5 yr of exposure. ^q (5-3-65) 36.3 yr of exposure.

ⁱ (10-17-45) 16.4 yr of exposure. ^r rTH-rust around threads.

^j (4-17-46) 17 yr of exposure. ^s (5-4-67) 38.3 yr of exposure.

^k (4-27-54) 25 yr of exposure. ^t (4-22-69) 40.3 yr of exposure.

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TABLE 2 Bare Panels, 4 by 6 in.

Code No.	Material ^a	Location	Removal Date	3rd Set Weight, g				2nd Set ^c		1st Set ^d	
				Original	Final ^b	Loss	Duration of Exposure, Years	Weight Loss, g	Duration of Exposure, Years	Weight Loss, g	Duration of Exposure, Years
1	Carbon steel	Newark	5/1/68	816.10	788.67	27.43	9.89	22.83	5.89	12.9	1.92
21	Malleable iron	Newark	5/1/68	690.12	765.57	24.64	9.89	19.12	5.89	13.5	1.92
2	Low-alloy steel I	Newark	5/1/68	757.38	746.95	10.43	9.89	9.22	5.89	7.2	1.92
3	Low-alloy steel II	Newark	5/1/68	754.00	743.85	10.15	9.89	9.22	5.89	6.0	1.92
4	Low-alloy steel III	Newark	5/1/68	756.15	742.45	13.70	9.89	11.21	5.89	9.6	1.92
0	Low-alloy Steel IV	Newark	5/1/68	771.32	764.68	6.64	9.89	7.27	5.89	4.6	1.92
1	Carbon steel	Kure Beach—80 ft	6/5/68	831.45	608.82	222.63	9.96	76.12	5.94	22.1	1.70
21	Malleable iron	Kure Beach—80 ft	6/5/68	718.20	537.20	181.00	9.96	115.54	5.94	21.1	1.70
2	Low-alloy steel I	Kure Beach—80 ft	6/5/68	...	...	...	N ^e	22.70	5.94	12.2	1.70
3	Low-alloy steel II	Kure Beach—80 ft	6/5/68	735.25	688.84	46.41	9.96	...	N ^e	13.4	1.70
4	Low-alloy steel III	Kure Beach—80 ft	6/5/68	769.70	724.34	45.36	9.96	...	N ^e	13.3	1.70
0	Low-alloy steel IV	Kure Beach—80 ft	6/5/68	764.65	736.00	28.65	9.96	21.66	5.94	11.9	1.70
1	Carbon steel	Kure Beach—800 ft	6/5/68	...	...	...	N ^e	32.07	5.94	14.0	1.70
21	Malleable iron	Kure Beach—800 ft	6/5/68	690.55	664.00	26.55	9.96	21.86	5.94	12.6	1.70
2	Low-alloy steel I	Kure Beach—800 ft	6/5/68	765.10	741.66	23.44	9.96	15.95	5.94	8.8	1.70
3	Low-alloy steel II	Kure Beach—800 ft	6/5/68	733.05	711.59	21.46	9.96	...	N ^e	9.2	1.70
4	Low-alloy steel III	Kure Beach—800 ft	6/5/68	746.25	712.61	33.64	9.96	22.51	5.94	10.3	1.70
0	Low-alloy steel IV	Kure Beach—800 ft	6/5/68	750.00	730.50	19.50	9.96	16.62	5.94	8.7	1.70

^a Composition reported in the 1959 ASTM *Proceedings*, Vol 59, p. 133.
^b Corrosion products were removed by immersion in sodium hydride bath.
^c Information is found in the 1961 ASTM *Proceedings*, Vol 61, p. 56.
^d Information is found in the 1965 ASTM *Proceedings*, Vol 65, p. 129.
^e N—No specimen exposed.

TABLE 3 Report of Inspection of Coated Steel Hardware, Newark, N. J. (Code 11)

Inspected: April 23, 1969, Exposed: June 13, 1958. Exposure Period: 10.9 Years
 Note—Abbreviations and Symbols: 0 = no rust; 5, 10, 25, 100 = approximate percentages; R = rusting of base metal; Y = yellow or orange appearance; R* = rust spots widely distributed; Tr = trace; N = no specimen exposed; X = average measured coating thickness.

Specimen Code*	Flat Panels			Bent Panels			Rounds		
	\bar{X} mils	Topside	Underside	\bar{X} mils	Topside	Underside	\bar{X} mils	Sides	
<i>Hot-Dip Zinc (Code 5)** (General Appearance: Dark to light yellow for flats and bends; gray to yellow for rounds)</i>									
Carbon Steel (Code 1).									
1-5-11-14	2.44	40R ^A -50Y	Tr-Y	2.28	40R ^A -55Y	5R ^A -80Y	5.90	Tr-R-70Y	
-15	2.24	95R ^A -5Y	10R ^A -40Y	2.13	60R ^A -40Y	5R ^A -80Y	5.54	10R ^A -70Y	
-16	2.16	90R ^A -10Y	10R ^A -10Y	2.15	60R ^A -40Y	15R ^A -70Y	4.32	Tr-R-70Y	
-17	1.86	100R ^A -0Y	15R ^A -80Y	1.91	80R ^A -20Y	10R ^A -80Y	4.87	Tr-R-70Y	
-18	2.70	20R ^A -75Y	Tr-R-10Y	1.96	80R ^A -20Y	25R ^A -75Y	4.59	Tr-R-70Y	
Low-Alloy Steels I, II, III, IV (Codes 2, 3, 4 and 0—no code)									
2-5-11-14	3.66	100Y	Tr-R-80Y	2.34	25R ^A -75Y	Tr-R-60Y	5.21	Tr-R-70Y	
-15	2.81	5R ^A -95Y	Tr-R-95Y	2.46	5R ^A -95Y	Tr-R-90Y	4.62	10R ^A -70Y	
-16	3.14	5R ^A -95Y	Tr-R-100Y	2.29	20R ^A -80Y	Tr-R-90Y	5.53	Tr-R-70Y	
-17	3.08	5R ^A -95Y	Tr-R-100Y	2.60	15R ^A -85Y	Tr-R-60Y	4.21	Tr-R-70Y	
-18	3.74	10R ^A -90Y	Tr-R-100Y	2.28	50R ^A -50Y	Tr-R-80Y	4.73	Tr-R-70Y	
3-5-11-14	2.63	5R ^A -95Y	5R ^A -60Y	2.42	50R ^A -50Y	5R ^A -75Y	N	...	
-15	2.54	5R ^A -95Y	5R ^A -25Y	2.41	25R ^A -75Y	5R ^A -60Y	N	...	
-16	2.86	5R ^A -95Y	Tr-R-50Y	2.72	10R ^A -90Y	Tr-R-60Y	N	...	
-17	3.18	Tr-R-100Y	Tr-R-40Y	2.50	20R ^A -80Y	Tr-R-70Y	N	...	
-18	2.72	Tr-R-95Y	Tr-R-50Y	2.49	50R ^A -50Y	Tr-R-70Y	N	...	
4-5-11-14	4.11	-25Y	-Tr-Y	2.29	70R ^A -30Y	10R ^A -20Y	N	...	
-15	3.31	30R ^A -70Y	5Y	2.09	90R ^A -10Y	10R ^A -20Y	6.00	Tr-R-70Y	
-16	4.19	Tr-R-40Y	5R ^A -25Y	2.22	60R ^A -40Y	Tr-R-20Y	4.05	Tr-R-70Y	
-17	2.88	50R ^A -40Y	Tr-R-25Y	2.20	80R ^A -20Y	10R ^A -20Y	5.45	Tr-R-70Y	
-18	2.30	90R ^A -5Y	Tr-R-25Y	2.84	40R ^A -50Y	Tr-R-20Y	5.13	Tr-R-70Y	
0-5-11-14	3.29	10R ^A -90Y	5R ^A -30Y	2.01	50R ^A -50Y	10R ^A -90Y	4.33	10R ^A -90Y	
-15	3.42	5R ^A -90Y	5R ^A -50Y	2.01	60R ^A -40Y	10R ^A -70Y	4.70	100Y	
-16	2.92	10R ^A -90Y	5R ^A -50Y	2.18	60R ^A -40Y	5R ^A -95Y	6.28	100Y	
-17	3.23	25R ^A -75Y	5R ^A -80Y	2.35	50R ^A -50Y	10R ^A -60Y	5.03	100Y	
-18	3.01	25R ^A -75Y	5R ^A -90Y	2.28	60R ^A -40Y	10R ^A -70Y	4.05	100Y	

REPORT OF COMMITTEE A-5 (APPENDIX III)

TABLE 3—Continued

Specimen Code*	Flat Panels		Bent Panels				Rounds	
	\bar{X} mils	Topside	Underside	\bar{X} mils	Topside	Underside	\bar{X} mils	Sides
Nodular Iron (Cast and Machined—Codes 19 and 20)								
19-6-11-14	4.77	-100Y	-20Y	N	...	...	N	...
-15	2.47	90R ^A -10Y	5R ^f -10Y	N	...	...	N	...
-16	4.88	-100Y	-5Y	N	...	...	N	...
-17	4.81	TrR-100Y	-5Y	N	...	...	N	...
-18	4.36	TrR-100Y	-5Y	N	...	...	N	...
20-6-11-14	6.47	-100Y	-5Y	N	...	...	N	...
-15	6.38	-100Y	-5Y	N	...	...	N	...
-16	5.97	-100Y	-5Y	N	...	...	N	...
-17	6.29	-100Y	-5Y	N	...	...	N	...
-18	6.57	-100Y	-5Y	N	...	...	N	...
Malleable Iron (Code 21) (General Appearance: gray to yellow)								
21-6-11-14	7.23	-100Y	-20Y	N	...	...	N	...
-15	7.06	-100Y	-20Y	N	...	...	N	...
-16	7.36	-100Y	-20Y	N	...	...	N	...
-17	6.89	-100Y	-20Y	N	...	...	N	...
-18	7.43	-100Y	-20Y	N	...	...	N	...
Hot-Dip Aluminum (Code 6)*** (General Appearance: gray and rough with black pinheads on flats and bents. Dirty and dark on rounds.)								
Low Alloy Steels I, II, III (Codes 2, 3 and 4)								
2-6-11-17	2.06	-TrY	0				N	...
3-6-11-14	2.40	-TrY ^b	0	1.72	0	-TrY ^b	N	...
-16				2.14	-TrY ^b	0		
4-6-11-15	2.92	-TrY ^b	0					
Hot-Dip Aluminum (Code 7)*** (General Appearance: gray and rough with black pinheads on flats and bents. Dirty and dark on rounds.)								
Low-Alloy Steel 1 (Code 2)								
2-7-11-14	4.28	-TrY	0					

TABLE 3—Continued

Electroplated Zinc (Code 8) (General Appearance: gray.)											
Carbon Steel (Code 1)											
Low-Alloy Steels I and IV (Codes 2 and 0—no code)											
		5R ^{ab} -5Y		1.74		65R ^a -25Y		40R ^a -30Y		90R ^a -5Y	
		10R ^{ab} -5Y		1.80		55R ^a -20Y		20R ^a -20Y		90R ^a -5Y	
		15R ^{ab} -5Y		2.46		50R ^a -20Y		20R ^a -30Y		100R ^a -5Y	
		10R ^{ab} -5Y		2.16		80R ^a -10Y		15R ^a -15Y		90R ^a -5Y	
		15R ^{ab} -5Y		1.62		90R ^a -5Y		20R ^a -25Y		80R ^a -5Y	
Low-Alloy Steels I and IV (Codes 2 and 0—no code)											
		5R ^{ab} -5Y		2.52		80R ^a -15Y		40R ^a -20Y		100R ^a -5Y	
		10R ^{ab} -5Y		3.39		20R ^{ab} -30Y		15R ^a -10Y		100R ^a -5Y	
		10R ^{ab} -10Y		2.98		30R ^{ab} -30Y		15R ^a -10Y		90R ^a -5Y	
		5R ^{ab} -10Y		3.36		15R ^a -20Y		15R ^a -10Y		100R ^a -5Y	
		5R ^{ab} -10Y		2.35		60R ^a -15Y		25R ^a -20Y		90R ^a -5Y	
		10R ^{ab} -5Y		2.39		20R ^{ab} -20Y		40R ^a -30Y		90R ^a -5Y	
		10R ^{ab} -5Y		2.70		30R ^{ab} -30Y		15R ^a -10Y		90R ^a -5Y	
		10R ^{ab} -5Y		2.18		40R ^a -30Y		30R ^{ab} -10Y		90R ^a -5Y	
		10R ^{ab} -5Y		2.93		15R ^a -15Y		5R ^a -5Y		100R ^a -5Y	
		10R ^{ab} -5Y		1.81		90R ^a -5Y		30R ^a -20Y		90R ^a -5Y	
Sprayed Zinc (Code 9) (General Appearance: bright with black pinheads on flats and bends.)											
Low-Alloy Steel IV (Code 0—no code)											
		0		TrR ^a -		TrR ^a -		N		...	
		0		TrR ^a -		0		N		...	
		TrR ^a -		TrR ^a -		TrR ^a -		N		...	
		TrR ^a -		TrR ^a -		TrR ^a -		N		...	
		TrR ^a -		TrR ^a -		TrR ^a -		N		...	
		TrR ^a -		TrR ^a -		TrR ^a -		N		...	

Sprayed Zinc (Code 9) (General Appearance: bright with black pinheads on flats and bents.)

Low-Alloy Steel IV (Code 0—no code)

* Specimen Code: Steel-Coating-Location-Replicate. Specimens not showing a trace of yellow or rust are not included, hence the blank spaces in some columns.

** Hot-dip zinc (Code 5) specimens were centrifuged immediately after coating to remove excess zinc. Details are contained in the 1959 ASTM Proceedings (Vol 59, p. 137).

*** Code 6 and Code 7 specimens were prepared by different aluminizing methods. Details are covered in the 1959 ASTM Proceedings (Vol 59, p. 137).

a Edges.

b Drill hole.

5R or more rust noted during inspection on:

5-1-62 after 3.93 yr of exposure.

4-30-63 after 4.93 yr of exposure.

5-5-64 after 5.94 yr of exposure.

5-4-65 after 6.94 yr of exposure.

5-13-66 after 7.92 yr of exposure.

5-5-67 after 8.92 yr of exposure.

5-1-68 after 9.89 yr of exposure.

4-23-69 after 10.86 yr of exposure.

REPORT OF COMMITTEE A-5 (APPENDIX III)

**TABLE 4 Report of Inspection of Coated Steel Hardware, Kure Beach, N. C.
(800-Ft Site—Code 12)**

Inspected: May 7, 1969. Exposed: June 23, 1958. Exposure Period: 10.9 Years

NOTE—Abbreviations and Symbols Used: 0 = no rust; 5, 10, 25, 100 = approximate percentages; R = rusting of base metal; Y = yellow or orange appearance; R* = rust spots widely distributed; Tr = trace; N = no specimen exposed; \bar{X} = average measured coating thickness.

Specimen Code*	Flat Panels			Bent Panels			Rounds	
	\bar{X} mils	Topside	Underside	\bar{X} mils	Topside	Underside	\bar{X} mils	Sides

Hot-Dip Zinc (Code 5)** (General Appearance: Gray-mottled white)

Carbon Steel (Code 1)

1-5-12-14	N			2.82	TrR ^a	TrR ^a		
-15	2.37	TrR ^a	TrR	2.05	TrR ^a	TrR ^a		
-16	2.18	TrR ^a	TrR	2.05	TrR ^a	TrR ^a		
-17	2.06	TrR ^a	TrR	1.98	TrR ^a	TrR ^a		
-18	2.01	TrR ^a	0	2.08	TrR ^a	TrR ^a		

Low-Alloy Steels I, II, III and IV (Codes 2, 3, 4 and 0—no code)

2-5-12-14	N	...	...	2.54	TrR ^a	TrR ^a		
-15	3.01	TrR ^a	TrR	2.74	TrR ^a	TrR ^a	5.38	TrR
-16	3.20	TrR ^a	TrR	2.49	TrR ^a	TrR ^a		
-17	3.36	TrR ^a	TrR	2.64	TrR ^a	TrR ^a		
-18	3.09	TrR ^a	TrR	2.51	TrR ^a	TrR ^a		
3-5-12-14	2.98	TrR ^a	TrR	2.24	TrR ^a	TrR ^a	N	...
-15	2.87	TrR ^a	TrR	2.29	TrR ^a	TrR ^a	N	...
-16	N	...	...	2.19	TrR ^a	TrR ^a	N	...
-17	2.47	TrR ^a	TrR	2.41	TrR ^a	TrR ^a	N	...
-18	2.38	TrR ^a	TrR	2.45	TrR ^a	TrR ^a	N	...
4-5-12-14	3.43	TrR ^a	TrR					
-15	2.51	0	TrR					
-16				3.10	TrR ^a	0		
-17	2.69	TrR ^a	0	2.76	0	TrR		
-18	N	...	...			
0-5-12-14	2.78	TrR	TrR	2.21	TrR ^a	TrR ^a		
-15	2.96	TrR ^a	TrR	2.04	TrR ^a	TrR ^a	5.44	TrR
-16	N	...	...	2.01	TrR ^a	TrR ^a	4.89	TrR
-17	3.13	TrR ^a	TrR	2.02	TrR ^a	TrR ^a	5.28	TrR
-18	2.89	TrR ^a	0	2.10	TrR ^a	TrR ^a	5.30	TrR

Nodular Iron (Cast and Machined—Codes 19 and 20)

19-5-12-15	2.83	TrR ^a	TrR	N	...	...	N	...
-16	4.62	TrR ^a	0	N	...	...	N	...
-17	N	...	...	N	...	...	N	...
-18	4.87	TrR ^a	0	N	...	...	N	...
20-5-12-14	N	...	...	N	...	...	N	...
-15	6.22	TrR ^a	0	N	...	...	N	...
-16	6.03	TrR ^a	0	N	...	...	N	...
-18	6.04	TrR ^a	0	N	...	...	N	...

Malleable Iron (Code 21)

21-5-12-17	N	...	...	N	...	...	N	...
-18	6.94	TrR	0	N	...	...	N	...

REPORT OF COMMITTEE A-5 (APPENDIX III)

TABLE 4—Continued

Specimen Code*	Flat Panels			Bent Panels			Rounds	
	\bar{X} mils	Topside	Underside	\bar{X} mils	Topside	Underside	\bar{X} mils	Sides

Hot-Dip Aluminum (Code 6)*** (General Appearance: gray)

Carbon Steel (Code 1)

1-6-12-14				2.48	TrY	0		
-15	2.63	TrY ^a	TrR	2.55	TrR	0	3.80	TrR ^b
-16	2.28	TrY ^a	TrR					
-17	3.17	TrY ^a	TrR	2.06	TrY	0		
-18	2.48	TrY	TrR	2.28	TrY	0		

Low-Alloy Steels I, II, III and IV (Codes 2, 3, 4 and 0—no code)

2-6-12-14				1.69	TrY	TrR	3.29	TrR ^b
-15	2.06	TrY ^a	0	1.86	TrY	TrR		
-16	2.16	5Y	TrR	1.94	TrY	TrR		
-17	2.47	TrY	TrY	1.80	TrY	TrR	3.86	TrR ^b
-18	2.74	TrY	TrY	1.99	TrY	TrR		
3-6-12-14	2.46	5Y ^o	TrY ^o				N	...
-15	2.17	TrY	TrR	1.42	0	TrY	N	...
-16	2.73	TrY	TrY	1.96	0	TrY	N	...
-17	2.43	5Y ^o	TrY ^o	1.54	TrY	TrY	N	...
-18	2.43	TrY ^a	TrY	1.45	0	TrY	N	...
4-6-12-14	2.38	TrY	0	2.22	TrY	TrY		
-15	2.69	TrY	0	2.20	TrY	TrY		
-16	2.76	TrY	0	2.61	TrR ^a	TrR		
-17	2.42	TrY	TrR	1.89	TrR ^a	10R ^A		
-18	2.79	TrY	TrR	2.21	TrR ^a	5R ^A	2.44	TrR ^b
0-6-12-14	2.01	TrY	TrY	1.98	5R ^A	5R ^A		
-15	2.32	TrY	TrY	1.85	TrY ^a	TrR	3.39	TrR ^b
-16	2.31	TrY ^a	TrY	1.72	TrY ^a	0		
-17	2.10	TrY	TrY	1.79	TrY ^a	TrR	2.96	TrR
-18	2.44	0	TrY	1.86	TrY ^a	TrR	5.00+	TrY

Hot-Dip Aluminum (Code 7)*** (General Appearance: medium gray)

Carbon Steel (Code 1)

1-7-12-14				2.49	TrR	0		
-15	3.79	TrR	0	2.34	TrR	0		
-16	3.88	TrR	0					
-18				2.45	0	TrR		

Low Alloy Steels I, II, III and IV (Codes 2, 3, 4 and 0—no code)

2-7-12-14	3.33	45R ^A	65R ^o	2.78	TrR	0		
-15	3.17	TrR	0	2.28	TrR	TrR		
-16	3.79	70R ^A	65R ^o	2.96	10R ^A	15R ^A		
-17	3.68	TrR	0	2.52	30R ^A	55R ^A		
-18				2.60	5R ^A	5R ^A		
3-7-12-14				2.49	15R ^A	10R ^A	N	...
-15				2.45	15R ^A	10R ^A	N	...
-16	2.87	10R ^A	15R ^d	2.06	20R ^A	20R ^A	N	...
-17				1.90	10R ^A	20R ^A	N	...
-18				3.41	TrR ^a	5R ⁱ	N	...

REPORT OF COMMITTEE A-5 (APPENDIX III)

TABLE 4—Continued

Specimen Code*	Flat Panels			Bent Panels			Rounds	
	\bar{X} mils	Topside	Underside	\bar{X} mils	Topside	Underside	\bar{X} mils	Sides
Low-Alloy Steels I, II, III and IV (Codes 2, 3, 4 and 0—no code)—Continued								
4-7-12-14				2.59	5R ^a	TrR		
-15				2.80	TrR	TrR		
-16				2.39	5R ^a	10R ^a	4.85	TrY ^b
-17				2.46	5R ^a	TrR		
-18	4.24	TrY	0	2.76	TrR	TrR		
0-7-12-14	2.40	5R ⁱ	10R ^f	2.10	5R ⁱ	TrR	1.06	20R ^{be}
-15	3.06	TrR	0	2.45	TrR	0	4.16	TrR
-16				2.02	5R ^a	10R ^a	5.20	TrR
-17				2.76	TrR	0		
-18				2.32	TrR	30R ^f	3.14	TrR

Electroplated Zinc (Code 8) (General Appearance: gray)

Carbon Steel (Code 1)

1-8-12-18	N	...	...	3.04	TrR ^a	0		
Low-Alloy Steel IV (Code 0—no code)								
0-8-12-17	N	...	...	2.36	TrR ^a	0		
-18				1.92	TrR ^a	0		

* Specimen Code: Steel-Coating-Location-Replicate. Specimens not showing a trace of yellow or rust not included, hence the blank spaces in columns.

** Hot-dip zinc (Code 5) samples were centrifuged immediately after coating to remove excess zinc. Details are contained in the 1959 ASTM *Proceedings* (Vol 59, p. 137).

*** Code 6 and Code 7 specimens were prepared by different aluminizing methods. Details are covered in the 1959 ASTM *Proceedings* (Vol 59, p. 137).

^a Edge rust on side towards ocean.

^b End.

^c Blisters widely distributed.

5R or more rust first noted during inspection on:

^d 5-31-60 after 1.94 yr of exposure.

^e 5-23-61 after 2.98 yr of exposure.

^f 5-3-63 after 4.94 yr of exposure.

^g 6-1-64 after 5.94 yr of exposure.

^h 6-1-66 after 7.94 yr of exposure.

ⁱ 6-5-68 after 9.78 yr of exposure.

^j 5-7-69 after 10.88 yr of exposure.

REPORT OF COMMITTEE A-5 (APPENDIX III)

TABLE 5 Report of Inspection of Coated Steel Hardware, Kure Beach (80-Ft Site—Code 13)

Inspected: May 8, 1969. Exposed: June 23, 1958. Exposure Period: 10.9 Years

NOTE—Abbreviations and Symbols Used: 0 = no rust; 5, 10, 25, 100 = approximate percentages; R = rusting of base metal; Y = yellow or orange appearance; R* = pinpoints of rust spots widely distributed; Tr = trace; N = no specimen exposed; \bar{X} = average measured coating thickness.

Specimen Code*	Flat Panels			Bent Panels			Rounds	
	\bar{X} mils	Topside	Underside	\bar{X} mils	Topside	Underside	\bar{X} mils	Sides

Hot-Dip Zinc (Code 5)** (General Appearance: Light gray with yellow and red rust spots)

Carbon Steel (Code 1)

1-5-13-14	2.32	20R ^{sh}	TrR*	2.15	15R ^{sh}	TrR*	5.07	TrR*
-15	2.26	20R ^{sh}	TrR*	2.24	5R ^{sh}	TrR*	3.86	TrR*
-16	2.21	15R ^{sh}	TrR*	2.42	10R ^{sh}	TrR*	4.66	TrR*
-17	2.29	10R ^{sh}	TrR*	1.98	20R ^{sh}	TrR*	5.56	TrR*
-18	2.40	10R ^{sh}	TrR*	1.98	20R ^{sh}	TrR*	4.35	TrR*

Low-Alloy Steels I, II, III and IV (Codes 2, 3, 4 and 0—no code)

2-5-13-14	3.59	15R ^{sh}	TrR*	2.60	5R ^{sh}	TrR*	4.30	TrR*
-15	3.11	10R ^{sh}	TrR*	2.80	5R ^{sh}	TrR*	5.50	TrR*
-16	3.04	10R ^{sh}	TrR*	2.59	10R ^{sh}	TrR*	3.81	TrR*
-17	3.03	10R ^{sh}	TrR*	2.85	5R ^{sh}	TrR*	5.83	TrR*
-18	3.31	10R ^{sh}	TrR*	2.28	10R ^{sh}	TrR*	4.00	TrR*
3-5-13-14	2.62	10R ^{sh}	TrR*	2.49	5R ^{sh}	TrR*	N	...
-15	2.71	10R ^{sh}	TrR*	2.39	5R ^{sh}	TrR*	N	...
-16	2.72	10R ^{sh}	TrR*	2.33	10R ^{sh}	TrR*	N	...
-17	2.87	10R ^{sh}	TrR*	2.56	10R ^{sh}	TrR*	N	...
-18	3.08	10R ^{sh}	TrR*	2.14	10R ^{sh}	TrR*	N	...
4-5-13-14	3.90	TrR*	TrR*	3.12	TrR*	TrR*	5.89	TrR*
-15	3.49	TrR*	TrR*	2.52	10R ^{sh}	TrR*	6.00	TrR*
-16	3.62	5R ^{sh}	TrR*	3.44	TrR*	TrR*	4.05	TrR*
-17	3.07	10R ^{sh}	TrR*	2.58	5R ^{sh}	TrR*	5.45	5R ^{sh}
-18	3.51	TrR*	TrR*	2.81	5R ^{sh}	TrR*	5.13	5R ^{sh}
0-5-13-14	3.18	10R ^{sh}	TrR*	2.12	15R ^{sh}	TrR*	4.73	TrR ^b
-15	3.08	10R ^{sh}	TrR*	2.15	15R ^{sh}	TrR*	5.31	TrR ^b
-16	3.43	10R ^{sh}	TrR*	2.21	10R ^{sh}	TrR*	5.16	TrR ^b
-17	3.18	10R ^{sh}	TrR*	2.19	10R ^{sh}	TrR*	5.19	TrR ^b
-18	3.10	10R ^{sh}	TrR*	2.09	10R ^{sh}	TrR*	5.68	TrR ^b

Nodular Iron (Cast—Code 19) (General Appearance: gray)

19-5-13-14	4.28	TrR*	0	N	...	...	N	...
-15	4.51	TrR*	0	N	...	...	N	...
-16	2.77	15R ^{sh}	0	N	...	...	N	...
-17	4.36	TrR*	0	N	...	...	N	...
-18	4.83	TrR*	0	N	...	...	N	...

Nodular Iron (Machined—Code 20) (General Appearance: gray)

20-5-13-14	5.51	TrR*	0	N	...	...	N	...
-15	6.14	TrR*	0	N	...	...	N	...
-16	6.48	TrR*	0	N	...	...	N	...
-18	6.57	0	TrR*	N	...	...	N	...

REPORT OF COMMITTEE A-5 (APPENDIX III)

TABLE 5—Continued

Specimen Code*	Flat Panels			Bent Panels			Rounds	
	\bar{X} mils	Topside	Underside	\bar{X} mils	Topside	Underside	\bar{X} mils	Sides
Malleable Iron (Code 21) (General Appearance: gray)								
21-5-13-14	6.77	TrR*	0	N	...	...	N	...
-15	6.92	TrR*	0	N	...	...	N	...
-16	7.39	TrR*	TrR*	N	...	...	N	...
-17	7.03	TrR*	0	N	...	...	N	...
-18	7.44	TrR*	0	N	...	...	N	...

Hot-Dip Aluminum (Code 6)*** (General Appearance: dull gray)

Carbon Steel (Code 1)

1-6-13-14	2.18	TrY ^a	0				2.71	TrY
-15	2.47	TrY ^a	0	2.42	TrR ^a	0	3.50	TrY
-16	2.33	TrY ^a	TrR	2.44	TrR ^a	0	3.58	TrY
-17	1.99	TrY ^a	TrR				2.86	TrY
-18	2.26	TrY ^a	TrR	2.51	TrY ^a	TrR	2.87	TrY

Low-Alloy Steels I, II, III and IV (Codes 2, 3, 4 and 0—no code)

2-6-13-14	2.70	TrY ^a	0	1.74	TrR	TrR	3.44	TrY
-15	2.19	TrY ^a	0	1.80	0	TrR	3.31	TrY
-16	2.98	TrY ^a	0	1.74	0	TrY ^a	3.37	TrY
-17	1.96	TrY ^a	0				2.96	TrY
-18	2.39	TrY ^a	TrR	1.81	0	TrY ^a	2.63	TrY
3-6-13-14	3.31	TrY ^a	0				N	...
-15	2.14	TrY ^a	0				N	...
-16	2.33	TrY ^a	0	1.69	TrR	TrR	N	...
-17	2.22	TrY ^a	0				N	...
-18	2.70	TrY ^a	TrR	1.54	TrR	0	N	...
4-6-13-14	2.66	TrY ^a	0	2.62	TrR	0	3.34	TrY
-15	2.71	TrY ^a	0	2.34	TrR	0	4.17	TrY
-16	3.02	TrY ^a	0	2.29	TrR	0	4.16	TrY
-17	2.77	TrY ^a	0	1.96	TrR	0	3.64	TrY
-18	2.43	TrY ^a	TrR	2.36	TrR	0	3.58	TrY
0-6-13-14	2.21	TrY ^a	0				4.53	TrY
-15	2.77	TrR ^a	TrR	1.90	TrY ^a	0	3.32	TrY
-16	1.91	TrR ^a	TrR				3.31	TrY
-17	2.08	TrR ^a	TrR				3.41	TrY
-18	2.58	TrR ^a	TrR	1.59	TrY ^a	TrR	3.28	TrY

Hot-Dip Aluminum (Code 7)*** (General Appearance: dull gray)

Carbon Steel (Code 1)

1-7-13-14	2.28	10R ^d	TrR	2.29	TrR ^a		4.03	TrY
-15	2.64	TrR	0	2.12	TrR ^a		3.70	TrY
-16				2.51	TrR ^a	TrR	4.89	TrY
-17	3.19	TrR ^a	0	2.21	TrR ^a		3.79	TrR ^b
-18	3.01	TrR ^a	0	2.66	TrR ^a		4.01	TrR ^b

Low-Alloy Steels I, II, III and IV (Codes 2, 3, 4 and 0—no code)

2-7-13-14	3.01	45R ^c	90R ^c	2.21	55R ^c	45R ^d	4.78	TrY
-15				3.30	5R ^c	TrR	4.05	TrY
-16	4.17	TrR ^a	0	2.30	20R ^c	10R ^d	4.70	TrY

REPORT OF COMMITTEE A-5 (APPENDIX III)

TABLE 5—Continued

Specimen Code*	Flat Panels			Bent Panels			Rounds	
	\bar{X} mils	Topside	Underside	\bar{X} mils	Topside	Underside	\bar{X} mils	Sides
Low-Alloy Steels I, II, III and IV (Codes 2, 3, 4 and 0—no code)—Continued								
-17	3.70	TrR ^a	0	3.31	5R ⁱ	5R ⁱ	2.67	TrY
-18	3.52	TrR ^a	0	2.25	10R ^d	60R ^d	3.32	TrY
3-7-13-14	4.54	TrR ^a	0	2.26	30R ^c	10R ^d	N	...
-15	3.60	TrR ^a	0	2.35	20R ^e	5R ^k	N	...
-16	3.21	TrR ^a	0	2.36	5R ⁱ	5R ⁱ	N	...
-17				2.40	10R ^j	10R ^h	N	...
-18	2.84	TrR ^a	0	2.16	15R ^j	5R ^h	N	...
4-7-13-14	3.01	TrR ^a	0	2.54	TrR ^a	0	3.77	TrY
-15				2.80	TrR ^a	0	3.96	TrY
-16	2.69	TrR ^a	0	2.59	TrR ^a	5R ⁱ	3.79	TrY
-17				2.81	TrR ^a	0	4.40	TrY
-18				2.69	TrR ^a	0	4.04	TrY
0-7-13-14	3.53	5R ⁱ	TrR	1.69	45R ^c	40R ^d	4.13	TrY
-15	3.33	TrR	0	1.84	20R ^e	5R ⁱ	4.91	TrY
-16				1.91	10R ^e	TrR	5.06	TrY
-17	3.43	TrR	0	2.04	55R ^c	40R ^d	5.61	TrY
-18	3.12	TrR	TrR	1.86	20R ^e	5R ^h	4.07	TrY

Electroplated Zinc (Code 8) (General Appearance: blue gray)

Carbon Steel (Code 1)

1-8-13-14	2.09	TrR ^{a*}	0	2.66	5R ^{a*}	TrR ^a	2.64	15R ^{*i}
-15	2.17	5R ^{a*}	0	2.41	10R ^{*i}	TrR ^a	2.89	15R ^{*i}
-16	1.68	15R ^{a*}	0	2.38	15R ^{*i}	TrR ^a	2.38	20R ^{*i}
-17	2.50	5R ^{a*}	0	2.25	20R ^{*i}	TrR ^a	3.15	15R ^{*i}
-18	2.53	5R ^{a*}	20R ^j	1.72	15R ^{*j}	TrR ^a	2.67	20R ^{*j}

Low-Alloy Steels (Codes 2 and 0—no code)

2-8-13-14				2.50	5R ^{*i}	TrR ^a	2.71	45R ^{*e}
-15	3.03	TrR ^{a*}	0	3.12	5R ^{*i}	TrR ^a	2.29	45R ^{*j}
-16	3.06	TrR ^{a*}	0	2.99	5R ^{*j}	TrR ^a	2.75	45R ^{*d}
-17	3.17	TrR ^{a*}	TrR	1.85	30R ^{*h}	TrR ^a	2.61	20R ^{*h}
-18	2.89	TrR ^{a*}	TrR	3.02	10R ^{*i}	TrR ^a	3.35	30R ^{*j}
0-8-13-14	3.56	TrR ^{a*}	0	3.01	TrR ^{a*}	TrR ^a	3.06	20R ^{*i}
-15	1.91	5R ^{*a*}	0	3.05	TrR ^{a*}	TrR ^a	2.37	5R ^{*i}
-16	2.51	TrR ^{a*}	0	2.78	5R ^{*i}	TrR ^a	2.39	TrR ^a
-17	2.53	TrR ^{a*}	0	2.55	10R ^{*i}	TrR ^a	2.96	TrR ^a
-18	2.41	TrR ^{a*}	0	3.19	TrR ^{a*}	TrR ^a	3.00	TrR ^a

* Specimen Code: Steel-Coating-Location-Replicate. Specimens not showing a trace of yellow or rust are not included, hence the blank spaces in columns.

** Hot-dip zinc (Code 5) specimens were centrifuged immediately after coating to remove excess zinc. Details are contained in the 1959 ASTM Proceedings (Vol 59, p. 137).

*** Code 6 and Code 7 specimens were prepared by different aluminizing methods. Details are covered in the 1959 ASTM Proceedings (Vol 59, p. 137).

^a Edge.

^b End (most rounds which exhibit TrR are on the end).

5R or more rust noted during inspection on:

^c 5-31-60 after 1.94 yr of exposure.

^d 5-23-61 after 2.98 yr of exposure.

^e 6-5-62 after 3.94 yr of exposure.

^f 5-3-63 after 4.94 yr of exposure.

^g 6-1-64 after 5.94 yr of exposure.

^h 6-2-65 after 6.94 yr of exposure.

ⁱ 6-1-66 after 7.94 yr of exposure.

^j 9-20-67 after 9.33 yr of exposure.

^k 6-5-68 after 9.78 yr of exposure.

^l 5-8-69 after 10.88 yr of exposure.

REVISED 1968 REPORT OF SUBCOMMITTEE XVI

APPENDIX IV

REPORT OF SUBCOMMITTEE XVI ON FIELD TEST OF ATMOSPHERIC CORROSION OF HARDWARE

This report covers the 1968 inspections of the 1958 program at Newark (New York area), N.J., and Kure Beach (80 and 800-ft sites), N.C.

Background

Details, including preparation of specimens, basis metal compositions, coating procedures, individual coating thickness, and metallographic examinations are in the 1959 *ASTM Proceedings* (Vol. 59, p. 133). Tabulations of the ranges and average thicknesses are condensed for all sets of specimens in the 1960 *ASTM Proceedings* (Vol. 60, p. 116).

The specimens for this program were prepared to meet a specified coating thickness of 2.0 to 2.5 mils which was established by the subcommittee to keep the exposure time to a reasonable length. A table in the 1961 *ASTM Proceedings* (Vol. 61, p. 56) shows the weight-loss data for uncoated panels of six of the basis steels removed from the three sites after approximately a two-year exposure. Weight-loss data on the second set of uncoated specimens removed after approximately six years are contained in a table in the 1965 *ASTM Proceedings* (Vol. 65, p. 130). The remaining uncoated specimens were removed after approximately ten years of exposure (1968) for weight loss determinations.

Newark Site

The inspection at Newark, N.J., was performed on May 1, 1968, a day with

the weather varying from cloudy to sunny and dry. The data taken are reported in Table 1 for 135 specimens.

The hot-dip zinc (Code 5) specimens reported with varying amounts of yellow and rust total 84 in 1968, the same since 1965. Specimens exhibiting 5R or more rust total 40 in 1968 as compared with 25 in 1967 and 18 in 1966. The general surface appearance of the flat and bent steel panels is dark to yellow, while the round specimens are gray to yellow. The flat panels of nodular and malleable iron are gray to yellow.

Three hot-dip aluminum (Code 6) specimens continue to show a trace of yellow at the edge or hole. One hot-dip aluminum (Code 7) specimen is reported this year with a trace of yellow on the surface. The general appearance of both hot-dip aluminum (Code 6 and 7) specimens is rough and gray with black pinheads on the flat and bent panels. Round specimens are dark gray and dirty for both codes.

The electroplated-zinc (Code 8) specimens reported in 1968 total 45, the same as in 1967. All exhibit 5R or more rust as compared with 42 in 1967, 29 in 1966, and 7 in 1965. Rounds continue to show the greater percentage of rust. The surfaces, at areas where there is no rust, are gray.

The sprayed-zinc (Code 9) specimens show traces of yellow and rust at the various drilled holes. The sprayed-aluminum (Code 10) specimens exhibit

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p. 96 - Replace corrected 1969 A-5 Sub XVI report, 2nd page:

REPORT OF COMMITTEE A-5 (APPENDIX IV)

no rust. The overall appearance of both Code 9 and 10 specimens is bright with pinheads of dirt.

Kure Beach, 80-Ft Site

This site was inspected on June 5, 1968, under the same conditions as the 800-ft site. All specimens were dry. Edge rust is reported on 19 specimens, as compared with 14 in 1967. Specimens at this site face the ocean. Details are given in Table 3 for 205 specimens.

The hot-dip zinc (Code 5) specimens reported in 1968 total 84 compared with 82 in 1967. Of the 48 specimens showing 5R or more rust, 2 were first noticed this year. The general appearance is light gray with yellow and red rust spots.

The hot-dip aluminum (Code 6) specimens reported in 1968 total 33 compared with 25 in 1967. The general appearance is dull gray.

The hot-dip aluminum (Code 7) specimens reported in 1968 total 44 compared with 36 in 1966. There was no increase in the number of specimens showing 5R or more rust. The general appearance is dull gray.

The electroplated-zinc (Code 8) specimens reported this year total 44, the same as in 1967. There was no increase in the number of specimens showing 5R or more rust. The general appearance is blue gray.

Sprayed-zinc (Code 9) and sprayed-aluminum (Code 10) specimens were not exposed at this site.

Kure Beach, 800-Ft Site

The inspection at Kure Beach, N.C., was performed on a hot, sunny day on June 5, 1968. The specimens were dry. The number of specimens exhibiting edge rust continues to increase. As noted

in 1966, edge rust is only on the east or seaward edge of the panels which face south. Details of the 1968 inspection appear in Table 2 for 136 specimens.

The hot-dip zinc (Code 5) specimens reported in 1968 with a trace of rust total 45 compared with 42 in 1967. All specimens appear gray-mottled white.

The hot-dip aluminum (Code 6) specimens reported in 1968 total 52 as compared with 41 in 1967. The general surface appearance is mottled-gray metallic.

The hot-dip aluminum (Code 7) specimens continue to exhibit the most advanced rust at this location. Thirty-six specimens are reported in 1968 as compared with 33 in 1967 and 23 in 1966. Specimens exhibiting 5R or more rust total 19 as compared with 17 in 1966 and 1967. All specimens other than those reported exhibiting rust have a medium-gray surface appearance.

The electroplated-zinc (Code 8) specimens reported in 1968 total 3 with a trace of rust at the edge on the seaward side. The general surface appearance of these specimens is blue gray.

The sprayed-zinc (Code 9) and the sprayed-aluminum (Code 10) specimens show a metallic appearance. Code 10 specimens continue to show the staining around the holes.

Summary

The total number of specimens reported as indicating rust or staining has increased from 437 in 1967 to 476 in 1968. Of the 1030 coated specimens placed on the test in 1958, 46.2 percent are listed in the present report and summarized following:¹

¹ All tabular material remains unchanged.

REPORT OF COMMITTEE A-6 ON MAGNETIC PROPERTIES

Committee A-6 on Magnetic Properties held two meetings during this period: on June 25, 1969, during the 71st Annual Meeting of the Society at the Chalfonte-Haddon Hall in Atlantic City, N. J.; and on Dec. 11, 1969, at the Netherlands-Hilton Hotel in Cincinnati, Ohio.

The number of persons active in committee work has dropped slightly during this period from 42 to 38. The distribution is now 18 producers, 15 consumers and 5 general interest members. The number of non-voting members involved in task group activities on the additional mailing list remains about the same at 42, making the total involved in activities on this subject 80 persons.

The Task Group on Manual of Magnetic Testing, D. C. Dieterly, chairman, has completed the work on the second chapter of the Test Manual and it is now available from ASTM Headquarters as *STP 371-S1, Direct-Current Magnetic Measurements for Soft Magnetic Materials*.

Officers elected in accordance with the bylaws of the committee for the ensuing term of 2 years are as follows:

Chairman, John Engelsted

Vice-Chairman, Warren S. Eberly

Secretary, Robert E. Mundy

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee A-6 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which became effective on the dates indicated:

New Standard:

A 598 - 69, Method of Test for Magnetic

Properties of Magnetic Amplifier Cores (Subcommittee II) (effective June 26, 1969)

This method provides test procedures for determining the magnetic performance of fully processed cores in magnetic amplifier-type applications. Test may be conducted at excitation frequencies of 60, or 400, or 1600 Hz (cps). Permissible core sizes for this method are limited only by the available power supplies and the range and sensitivity of the instrumentation.

This new standard appears in the 1969 *Annual Book of ASTM Standards*, Part 8.

Reapproval of Standards:

Standards reapproved by the committee and ready for submittal to Society ballot in compliance with the Society requirement that existing standards be revised or reapproved every five years are as follows:

A 340 - 65, Standard Definitions of Terms, Symbols and Conversion Factors Relating to Magnetic Testing.

A 342 - 64, Standard Methods of Test for Permeability of Feebly Magnetic Materials.

A 345 - 55, Standard Specifications for Flat-Rolled Electrical Steel.

A 346 - 64, Standard Methods of Test for Alternating-Current Magnetic Properties of Laminated Core Specimens.

RECOMMENDATIONS ON AMERICAN NATIONAL STANDARDS

By letter ballot of the committee the following Standards were recommended for acceptance and approval by the American National Standards Institute, Inc.:

Methods of Test for:

A 34 - 68, Magnetic Materials

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- A 343-68, Alternating-Current Magnetic Properties of Materials at Power Frequencies Using Wattmeter-Ammeter-Voltmeter Method and 25-cm Epstein Test Frame
- A 344-68, Electrical and Mechanical Properties of Magnetic Materials
- A 347-68, Alternating-Current Magnetic Properties of Materials using the Modified Hay Bridge Method with 25-cm Epstein Test Frame
- A 348-68, Alternating-Current Magnetic Properties of Materials using the Wattmeter-Ammeter-Voltmeter Method, 100 to 10,000 Hz and 25-cm Epstein Frame
- A 349-68, Alternating-Current Magnetic Properties of Materials using the Wattmeter-Ammeter-Voltmeter Method, 50 to 60 Hz and 50-cm Epstein Frame
- A 566-68, Alternating Current Magnetic Properties of Materials using Alternating-Current Potentiometer and 25-cm Epstein Frame

ACTIVITIES OF SUBCOMMITTEES

Advisory Committee (A. C. Beiler, chairman) has appointed M. J. Sinko liaison representative to the Magnetic Materials Producers Association (permanent magnet manufacturers). An attempt is being made to develop contact with the American Powder Metallurgy Institute.

Responsibility for the task group for revision of Method A 34 was transferred from the Advisory Committee to Subcommittee II.

Drafts of scopes of work for most of the subcommittees and task groups have been prepared and reviewed by the advisory committee. The other drafts will be reviewed shortly. In view of the publication of *STP 371-S1* (see above) Task Group 3 on the Test Manual is concentrating on A-C Magnetic Testing.

Subcommittee I on Nomenclature and Definitions (H. W. Lamson, chairman) has conducted a subcommittee ballot on over 100 new definitions and is reviewing a second group of proposed definitions in preparation for revision of Definitions A 340-65.

Subcommittee II on Methods of Test (J. W. Hale, chairman) is working on correcting deficiencies of the Gouy method of Method A 342, Tests for Permeability of Feebly

Magnetic Materials, and is considering proposed revisions of Method A 347 on use of the Hay Bridge and also the possibility of breaking Methods A 346 up into separate standards according to the test methods used for measuring lamination specimens.

After a favorable ballot in Subcommittee II on Methods A 34-68, Testing Magnetic Materials, was revised to incorporate a new table of densities for commercial materials and submitted to committee letter ballot (42 members) with the following results: 24 affirmative, 2 negative, and 2 abstaining. At this writing the negative vote has not been resolved.

Interlaboratory tests of Task Group 1 on D-C Testing of High Coercive Magnets and Task Group 5 on A-C Testing of Stamped Lamination Core Specimens are complete and will be summarized at the coming meeting.

Task Group 8 on Hysteresigraphs has partially completed a reference manual on D-C Hysteresigraphs and will complete the remaining work shortly.

Subcommittee III—Editorial (D. H. Jones, chairman) has performed editorial work on *STP 371-S1* (see above), but has no current active items.

Subcommittee IV on Material Specifications (D. C. Dieterly, chairman) and its associated Task Groups 9 and 11 on Nickel-Iron Alloys and Silicon-Iron Alloys respectively, met twice during the year. Specifications for the major nickel-iron magnetic alloys of commercial interest are now in the second draft. Specifications for fully processed nonoriented silicon iron alloys are still in the early stages of revision. Attempts are being made to resolve negative ballots in the task group on the proposed specification on grain-oriented silicon-iron.

This report has been submitted to letter ballot of the committee which consists of 38 voting members; 25 members returned ballots, of whom 25 voted affirmatively, and 0 voted negatively.

Respectfully submitted on behalf of the committee,

A. C. BEILER,
Chairman

JOHN S. WATSON,
Secretary

REPORT OF COMMITTEE A-9 ON FERROALLOYS

Committee A-9 on Ferroalloys held one meeting on Dec. 9, 1969, in Detroit, Mich.

The committee now consists of 34 voting members, of whom 12 are classified as producers, 15 as consumers, and 7 as general interest members. Consulting members were urged to consider conversion to company or personal memberships. There are 16 nonvoting members on the committee.

There was no change in the committee organization. All members had reviewed the scope, but no change was suggested.

J. C. Cline continues to maintain liaison with Committee E-3 on Analytical Procedures. E. R. Saunders has been appointed to maintain liaison with the subcommittee of E-3 which is working on Specification E 32, Sampling of Ferroalloys for Determination of Chemical Composition. This standard is being revised to incorporate a statistical approach to sampling of heterogeneous materials.

Members of the committee approved by letter ballot the following slate of officers which will serve for the next two years:

Chairman, A. G. Cook.

Vice-Chairman, E. F. Lucas.

Secretary, W. W. Brown.

ACTION ON STANDARDS

The committee has reapproved the following current standards without change:

A 98 - 64, Spiegeleisen,

A 102 - 64, Ferrovandium,

A 132 - 64, Ferromolybdenum,

A 146 - 64, Molybdenum Oxide Products,

A 483 - 64, Silicomanganese, and

A 495 - 64, Calcium-Silicon and Calcium-Manganese-Silicon.

The results of the balloting will be forwarded to the Society in the immediate future.

The committee also approved in November 1969, by letter ballot, a new standard on

The specification was revised to include expansion of the number of ferrosilicon grades.

AMERICAN NATIONAL STANDARDS

The following standards have been approved during the year as American National Standards by the American National Standards Institute:

Sampling and Testing Ferroalloys for Determination of Size Composition (prepared by a Special Task Group (E. R. Saunders)). This document, which will be forwarded to the Society for acceptance shortly, covers the procedure to be used in obtaining samples of ferroalloy for subsequent determination of the size consist of the material represented by the sample.

ISO ACTIVITY

The committee was advised at its December meeting that an International Standards Organization (ISO) Technical Committee on Ferroalloys has been formed (TC 132) and that Russia has been appointed to the Secretariat. The name and scope of TC 132 will be developed at its first meeting, which as yet has not been scheduled. The Reactive Metals Committee of the Manufacturing Chemists Association has advised that it will assist in funding the USA activity.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee A-9 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which became effective on the dates indicated:

New Standard:

A 601 - 69, Specification for Electrolytic Manganese Metal (Task Group I) (effective Nov. 14, 1969)

This specification covers an alloying agent used in various melting procedures.

Revision of Standard:

A 100 - 69 (formerly A 100 - 64), Specification for Ferrosilicon (Task Group II) (effective Oct. 17, 1969)

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The specification was revised to include expansion of the number of ferrosilicon grades.

AMERICAN NATIONAL STANDARDS

The following standards have been approved during the year as American National Standards by the American National Standards Institute:

Specifications for:

- A 98 - 64; ANSI G65.1-1969, Spiegeleisen
- A 99 - 64; ANSI G66.1-1969, Ferromanganese
- A 100 - 60; ANSI G67.1-1970, Ferrosilicon
- A 101 - 64; ANSI G68.1-1969, Ferrochromium
- A 102 - 64; ANSI G69.1-1969, Ferrovanadium
- A 132 - 64; ANSI G70.1-1969, Ferromolybdenum
- A 144 - 66; ANSI G71.1-1969, Ferrotungsten
- A 146 - 64; ANSI G72.1-1969, Molybdenum Oxide Products
- A 323 - 65; ANSI G73.1-1969, Ferroboron
- A 324 - 66; ANSI G74.1-1969, Ferrotitanium
- A 481 - 66; ANSI G75.1-1969, Chrome Metal
- A 482 - 66; ANSI G76.1-1969, Ferrochrome-Silicon

A 483 - 64; ANSI G77.1-1969, Silicomanganese

A 495 - 64; ANSI G78.1-1969, Calcium-Silicon and Calcium-Manganese Silicon

A 550 - 65; ANSI G79.1-1969, Ferrocolumbium

ACTIVITIES OF SUBCOMMITTEES

A Special Task Group (L. M. Diran, chairman), responsible for preparing a standard for sintered nickel oxide, has submitted a document which is now ready for committee ballot.

All task groups have been requested to review standards with 1965 and 1966 effective dates for which they are responsible, and to recommend either revision or reapproval at an early date.

Since all of the information and data included in the Annual Report have been covered by individual letter ballots during the year and have received the required number of affirmative votes, the entire Annual Report has not been submitted to letter ballot.

Respectfully submitted on behalf of the committee,

W. H. MAYO,
Chairman

A. G. COOK,
Secretary

REPORT OF COMMITTEE A-10 ON IRON-CHROMIUM, IRON-CHROMIUM-NICKEL AND RELATED ALLOYS

Committee A-10 on Iron-Chromium, Iron-Chromium-Nickel and Related Alloys and its subcommittees held two meetings during the year: on June 23-26, 1969, in Atlantic City, N. J., and on Dec. 1-3, 1969, in Pittsburgh, Pa. In addition, a special meeting of the Executive Committee was held in Pittsburgh, Pa. on April 30, 1969.

The committee has a total membership of 175 of whom 134 are voting members classified as 65 producers, 47 consumers, and 22 general interest.

A. G. Cook was presented the ASTM Award of Merit at the 1969 Annual Meeting.

Committee A-10 sponsored publication of *ASTM DS 45, Compilation of Trade Names, Specifications, and Producers of Stainless Alloys and Superalloys*, which appeared in November 1969.

In August 1969 the proceedings of the 1968 Symposium, *Stainless Steel for Architecture*, were published as *ASTM STP 454*.

During the Annual Meeting in Atlantic City, N. J., on June 25, 1969, Committee A-10 sponsored, jointly with the Joint Committee on Effect of Temperature on the Properties of Metals, an informal panel workshop session, "Creep and Creep Rupture Properties of Austenitic Stainless Steels."

The officers elected to serve Committee A-10 for the ensuing term of two years are as follows:

Chairman, Andrew Van Echo
Producer Vice-Chairman, R. B. Gunia
Consumer Vice-Chairman, D. C. Brown
Secretary, R. L. Chapple

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee A-10 submitted the following

recommendations to the Society for action under the Interim Procedure for Standards, which became effective on the dates indicated:

New Standard:

A 608 - 70, Specification for Centrifugally Cast Iron-Chromium-Nickel High Alloy Tubing for Pressure Application at High Temperature (Subcommittee X) (effective April 13, 1970)

This specification covers iron-chromium-nickel, high-alloy tubes made by the centrifugal casting process intended for use under pressure at high temperatures.

Revision of Standards:

A 167 - 69 (formerly A 167 - 63), Standard Specification for Corrosion-Resisting Chromium-Nickel Steel Plate, Sheet and Strip (Subcommittee IX) (effective Oct. 17, 1969)

The revision included Grade XM-15.

A 167 - 70 (formerly A 167 - 69), Specification for Corrosion-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip (Subcommittee IX) (effective June 12, 1970)

This was revised in accordance with AISI changes.

A 176 - 69 (formerly A 176 - 63), Standard Specification for Corrosion-Resisting Chromium Steel Plate, Sheet and Strip (Subcommittee IX) (effective Oct. 17, 1969)

The revision included Types 430A and 430B to replace Type 430.

A 176 - 70 (formerly A 176 - 69), Specification for Corrosion-Resisting Chromium

REPORT OF COMMITTEE A-10

Steel Plate, Sheet, and Strip (Subcommittee IX) (effective June 12, 1970)

The revision included a new grade and changed the composition limits for Type 430.

A 240 - 69 (formerly A 240 - 67), Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Fusion-Welded Unfired Pressure Vessels (Subcommittee IX) (effective July 3, 1969)

A 240 - 70 (formerly A 240 - 69), Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Fusion-Welded Unfired Pressure Vessels (Subcommittee IX) (effective June 12, 1970)

The chemical requirements were revised.

A 265 - 69 (formerly A 265 - 66), Standard Specification for Nickel and Nickel-Base Alloy Clad Steel Plate (Subcommittee IX) (effective Sept. 19, 1969)

Paragraph 5.2 was revised to incorporate all the ASTM specifications for cladding material that were pertinent.

A 268 - 70 (formerly A 268 - 68), Specification for Seamless and Welded Ferritic Stainless Steel Tubing for General Service (Subcommittee XI) (effective June 12, 1970)

This revision added TP-430 Ti to Table I and added TP-430 Ti to Tables II and III with same tensile and hardness requirements as TP-430.

A 276 - 70 (formerly A 276 - 67), Specification for Stainless and Heat-Resisting Steel Bars and Sheets (Subcommittee VIII) (effective June 12, 1970)

The composition of Types 304, 305, and 430 was revised in accordance with AISI changes and a new Type 429 was added.

A 312 - 70 (formerly A 312 - 69), Specification for Seamless and Welded Austenitic Stainless Steel Pipe (Subcommittee XI) (effective June 12, 1970)

This revision permitted the use of any of the standard, machined round tension specimens. Table II was also revised.

A 313 - 70 (formerly A 313 - 67), Specification for Chromium-Nickel Stainless and Heat-Resisting Steel Spring Wire (Subcommittee VIII) (effective May 29, 1970)

This specification was revised to add Types 304, 305, 316, 631, and Grade XM-16.

A 314 - 70 (formerly A 314 - 63), Specifications for Stainless and Heat-Resisting Steel Billets and Bars for Reforging (Subcommittee VIII) (effective June 12, 1970)

The composition of Types 304, 305, and 430 was revised in accordance with AISI changes and a new Type 429 was added.

A 473 - 70 (formerly A 473 - 63), Specification for Stainless and Heat-Resisting Steel Forgings (Subcommittee IV) (effective June 12, 1970)

The changes were: revised composition of Types 304, 305, 430F and 430FSe in accordance with AISI changes; changed Type "430A" to Type "429"; changed Type "430B" to Type "430".

A 478 - 70 (formerly B 478 - 67), Specification for Chromium-Nickel Stainless and Heat-Resisting Steel Weaving Wire (Subcommittee VIII) (effective June 12, 1970)

The composition of Types 304 and 305 was revised in accordance with AISI changes.

A 492 - 70 (formerly B 492 - 67), Specification for Stainless and Heat-Resisting Steel Rope Wire (Subcommittee VIII) (effective June 12, 1970)

The composition of Types 304 and 305 was revised in accordance with AISI changes.

A 493 - 70 (formerly B 493 - 68), Specification for Stainless and Heat-Resisting Steel for Cold Heading and Cold-Forging-Bar and Wire (Subcommittee VIII) (effective June 12, 1970)

This was revised to reflect current practice.

A 494 - 70 (formerly A 494 - 62), Specification for Nickel and Nickel Alloy Castings (Subcommittee X) (effective May 29, 1970)

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The revision was to add new grades.

A 581 - 70 (formerly A 581 - 67), Specification for Free-Machining Stainless and Heat-Resisting Steel Wire (Subcommittee VIII) (effective June 12, 1970)

The composition of Types 430F and 430FSe was revised in accordance with AISI changes.

A 582 - 70 (formerly A 582 - 67), Specification for Free-Machining Stainless and Heat-Resisting Steel Bars Hot-Rolled or Cold-Finished (Subcommittee VIII) (effective June 12, 1970)

The composition of Types 430F and 430FSe was revised in accordance with AISI changes.

AMERICAN NATIONAL STANDARDS

The following standards have been approved during the year as American National Standards by the American National Standards Institute:

A 167 - 63; G81.1-1970, Specification for Corrosion-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip

A 176 - 63; G81.2-1970, Specification for Corrosion-Resisting Chromium Steel Plate, Sheet, and Strip

A 177 - 67; G81.3-1970, Specification for High-Strength Stainless Chromium-Nickel Steel Sheet and Strip

A 240 - 67; G81.4-1970, Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Fusion-Welded Unfired Pressure Vessels

A 262 - 68; G81.5-1970, Recommended Practices for Detecting Susceptibility to Intergranular Attack in Stainless Steels

A 263 - 66; G81.6-1970, Specification for Corrosion-Resisting Chromium Steel Clad Plate, Sheet and Strip

A 246 - 66; G81.7-1970, Specification for Stainless Chromium-Nickel Steel Clad Plate, Sheet, and Strip

A 265 - 66; G81.8-1970, Specification for Nickel and Nickel-Base Alloy Clad Steel Plate

A 279 - 63; G81.9-1970, Method of Total Immersion Corrosion Test of Stainless Steels

A 296 - 68; G81.10-1970, Specification for Corrosion-Resistant Iron-Chromium, Iron-Chromium-Nickel, and Nickel Base Alloy Castings for General Application

A 297 - 67; G81.11-1970, Specification for Heat-Resistant Iron-Chromium and Iron-Chromium-Nickel Alloy Castings for General Application

A 313 - 67; G81.12-1970, Specification for Chromium-Nickel Stainless and Heat-Resisting Steel Spring Wire

A 314 - 63; G81.13-1970, Specification for Stainless and Heat-Resisting Steel Billets and Bars for Reforging

A 362 - 63; G81.14-1970, Specification for Iron-Chromium and Iron-Chromium-Nickel Alloy Tubular Centrifugal Castings for General Applications

A 368 - 55; G81.15-1970, Specifications for Stainless Steel Wire Strand

A 380 - 57; G81.16-1970, Recommended Practice for Descaling and Cleaning Stainless Steel Surfaces

A 412 - 63; G81.17-1970, Specification for Stainless and Heat-Resisting Chromium-Nickel-Manganese Steel Plate, Sheet, and Strip

A 429 - 63; G81.18-1970, Specification for Hot-Finished Bars and Cold-Finished Bars of Stainless and Heat-Resisting Chromium-Nickel-Manganese Steel

A 447 - 50; G81.19-1970, Specifications for Chromium-Nickel-Iron Alloy Castings (25-12 Class) for High-Temperature Service

A 448 - 50; G81.20-1970, Specifications for Nickel-Chromium-Iron Alloy Castings (35-15 Class) for High-Temperature Service

A 452 - 65; G81.22-1970, Specification for Centrifugally Cast Austenitic Cold-Wrought Pipe for High-Temperature Service

A 457 - 63; G81.23-1970, Specification for Hot, Hot-Cold-Worked, and Cold-Worked Alloy Steel Plate, Sheet, and Strip for High Strength at Elevated Temperatures

A 458 - 63; G81.24-1970, Specification for Hot, Hot-Cold-Worked, and Cold-Worked Alloy Steel Bars for High Strength at Elevated Temperatures

A 461 - 65; G81.25-1970, Specification for Precipitation Hardening Alloy Bars, Forging Stock for High-Temperature Service

A 473 - 63; G81.26-1970, Specification for

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Stainless and Heat-Resisting Steel Forgings

- A 477 - 63; G81.27-1970, Specification for Hot Worked, Hot-Cold Worked and Cold Worked Alloy Steel Forgings and Forging Billets for High Strength at Elevated Temperatures
- A 478 - 67; G81.28-1970, Specification for Chromium-Nickel Stainless and Heat-Resisting Steel Weaving Wire
- A 479 - 63; G81.29-1970, Specification for Stainless and Heat-Resisting Steel Bars and Shapes for Use in Boilers and Other Pressure Vessels
- A 480 - 69; G81.30-1970, Specification for General Requirements for Delivery of Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip
- A 484 - 65; G81.31-1970, Specification for General Requirements for Stainless and Heat Resisting Wrought Steel Products (Except Wire)
- A 492 - 67; G81.32-1970, Specification for Stainless and Heat-Resisting Steel Rope Wire
- A 493 - 68; G81.33-1970, Specification for Stainless and Heat-Resisting Steel for Cold Heading and Cold Forging-Bar and Wire
- A 494 - 62; G81.34-1970, Specification for Nickel-Molybdenum and Nickel-Molybdenum-Chromium Alloy Castings
- A 518 - 64; G81.35-1970, Specification for Corrosion-Resistant High Silicon Cast Iron
- A 555 - 67; G81.36-1970, Specification for General Requirements for Stainless and Heat-Resisting Steel Wire
- A 560 - 66; G81.37-1970, Specification for Chromium-Nickel Alloy Castings
- A 564 - 66; G81.38-1970, Specification for Hot-Finished or Cold-Finished Precipitation-Hardening Stainless and Heat-Resisting Steel Bars and Shapes
- A 565 - 66; G81.39-1970, Specification for Martensitic Stainless Steel Bars, Forgings and Forging Stock for high Temperature Service
- A 567 - 66; G81.40-1970, Specification for Iron, Cobalt, and Nickel Base Alloy Castings for High Strength at Elevated Temperatures
- A 580 - 67; G81.41-1970, Specification for Stainless and Heat-Resisting Steel Wire
- A 581 - 67; G81.42-1970, Specification for

Free-Machining Stainless and Heat-Resisting Steel Wire

- A 582 - 67; G81.43-1970, Specification for Free-Machining Stainless and Heat Resisting Steel Bars, Hot-Rolled or Cold-Finished

ACTIVITIES OF SUBCOMMITTEES

Subcommittee II Editorial (C. R. Mayne, chairman) continued its study of titles of standards as well as their content.

Subcommittee IV on Methods of Corrosion Testing (M. H. Brown, chairman) met twice during the year.

A task group is making progress in the preparation of a new special technical publication on stress corrosion cracking of stainless steel. It is expected that a rough draft will be available for review late in 1970.

A revised draft of a Recommended Practice for Cleaning Stainless Steels in Architectural Applications will be available for review early in 1970.

Revision of Recommended Practice A 380, for Descaling and Cleaning Stainless Steel Surfaces, is essentially complete and should be balloted early in 1970.

Consideration is being given to inclusion in Recommended Practice A 262, for Detecting Susceptibility to Intergranular Attack in Stainless Steels, of typical acceptable or limiting corrosion rates.

Subcommittee V Mechanical Testing (S. E. Tyson, chairman) held two meetings during the year. They have just begun a ballot on the revision of Table VI to extend conversion of hardness to Rockwell B 100 in E 140, Hardness Conversion Tables for Metals.

Several other subjects involving mechanical testing are under discussion in the subcommittee.

Subcommittee VI on Metallography (Andrew Van Echo, chairman) held one meeting during the year. A task group from this subcommittee has been active in maintaining liaison with a task group of Committee E-4 that is drafting a procedure for determining the inclusion content of nickel-base high-temperature alloys which it is hoped may be useful as a guide for drafting a method for stainless steels.

The subcommittee has under consideration the matter of methods for determining the

REPORT OF COMMITTEE A-10

ferrite content of castings of AISI Type 304, 304L, 316, and 316L.

Subcommittee VIII Wrought Products (R. B. Gunia, chairman) met twice during the year in Atlantic City on June 23, and in Pittsburgh on Dec. 1, 1969.

The wire specifications under this subcommittee's jurisdiction have been updated and are ready for Committee A-10 ballot. Two of the standards will be balloted simultaneously in Subcommittee VIII and Committee A-10.

Two negative votes have been registered in regard to adding of the "H" grades to Specification A 479. An effort is being made to resolve these negatives and submit the matter to an A-10 vote.

Addition of nitrogen bearing grades of 304 and 316 will be considered by the committee later this year.

Subcommittee IX Flat Rolled Products (A. G. Cook, chairman) met twice during the year, in Atlantic City in June and in Pittsburgh in December 1969.

The subcommittee took three ballots during the year and two of those resulted in negative votes which are now being resolved. A ballot on the revision of the analysis range of Type XM-8 in Specification A 240 was approved and will be balloted by A-10.

A subcommittee letter ballot will be taken on the addition of nitrogen at the 0.10 to 0.20 percent range in 304 and 316 types in Specification A 240.

Two surveys are underway in the subcommittee. One of these is a computer analysis of the mechanical properties of material being shipped to Subcommittee IX specifications. The other survey will determine actual Rockwell and Brinell hardness values being recorded on material produced to Subcommittee IX specifications.

Subcommittee X Castings (H. C. Templeton, chairman)—A revision in the chromium range from 15 to 19 percent has been accomplished. Addition of grade CA-15M (12 Cr-4

Ni) has been proposed in two standards; Specifications A 296 and A 351.

The subcommittee has voted to eliminate Specification A 448 and place this grade in Specification A 297 with a changed chromium range from 13 to 17 percent to 15 to 19 percent.

Subcommittee XI Tubing (T. D. Parker, chairman) met twice during 1969. It completed revisions to 13 specifications. Work continues on three new specifications including a supplementary specification for nuclear service, a standard for austenitic feedwater tubing, and a standard for stainless domestic water tubing. No progress has been made in the deletion of the "XYZ" marking but a task force is reviewing the matter further.

Subcommittee XII Superalloys (W. R. Kegerise, chairman) met twice during 1969.

Specifications covering the cobalt base alloys and the nickel base alloys were submitted to subcommittee ballot during the year and some negative votes were registered which are in the process of resolutions. A task force was appointed to review and revise Specifications A 457, A 458, and A 477 as necessary.

Subcommittee XIII Specifications for Nuclear and Other Special Applications (G. R. Woodrow, chairman) met once during 1969.

This subcommittee has requested withdrawal of a supplementary requirement specification covering plate, sheet, and strip which has been previously approved by Committee A-10. Other supplementary requirements are being reviewed and revised as required. This committee intends to contribute to all concerned committees in ASTM where codes, regulations, and specifications cover quality assurance aspects of material for these special applications.

Respectfully submitted on behalf of the committee,

R. B. GUNIA,
Acting Chairman

R. L. CHAPPLE,
Secretary

REPORT OF COMMITTEE

B-1 ON WIRES FOR ELECTRICAL CONDUCTORS

Committee B-1 on Wires for Electrical Conductors held three meetings during the year: in Philadelphia, Pa., on Oct. 22, 1969; in Washington, D.C., on Jan. 15, 1970; and Quebec, Canada, on May 19, 1970. Meetings of Subcommittees I, IV, V, VI, and VII also were held during the year.

The committee consists of 59 members, of whom 42 are classified as producers, 27 as consumers, and 20 as general interest members.

In recognition of his long time services to the committee, C. H. Seaberg, who retired recently, was elected an Honorary Member of the committee.

The committee regretfully accepted the resignations of H. W. Adams as chairman of Subcommittee VII and A. W. Holmes as chairman of Subcommittee VI. These men have served long and faithfully as subcommittee chairmen. We are thankful they will remain members of the committee and continue to give us the benefit of their knowledge and judgment.

In accordance with the Regulations Governing ASTM Committee B-1, R. L. Gladwell was appointed chairman of Subcommittee VII and R. D. Pyle chairman of Subcommittee VI.

The officers elected for the ensuing term of two years are as follows:

Chairman, A. H. Sellers.

Vice Chairman, R. H. Lloyd.

Secretary, R. E. Larson.

Members-at-Large, Advisory Subcommittee, E. G. Driscoll, A. A. Jones, W. J. King, R. B. Smith, C. W. Straitor.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee B-1 submitted the following

recommendations to the Society for action under the Interim Procedure for Standards, which became effective on the dates indicated:

New Standard Specifications for:

B 500 - 69, Zinc-Coated (Galvanized) and Aluminum-Coated (Aluminized) Stranded Steel Core for Aluminum Conductors, Steel Reinforced (ACSR) (Subcommittee V) (effective Sept. 24, 1969)

This specification covers 7-wire and 19-wire, zinc-coated (galvanized) and aluminum-coated (aluminized) stranded steel core intended for use in aluminum conductors, steel reinforced (ACSR).

B 501 - 69, Silver-Coated Copper-Clad Steel Wire for Electronic Applications (Subcommittee VI) (effective Nov. 7, 1969)

Silver coatings in percentages by weight of the total weight of the coated wire are as follows: 1.25, 2.5, 4.0, 6.1, and 8.0. Four classes of copper-clad steel wire are covered as follows: Class 30 HS nominal 30 percent conductivity hard-drawn, Class 30 A nominal 30 percent conductivity annealed, Class 40 HS nominal 40 percent conductivity hard-drawn, and Class 40 A nominal 40 percent conductivity annealed.

B 502 - 70, Aluminum-Clad Steel Wire for Aluminum Conductor Steel Reinforced (Subcommittee VI) (effective June 10, 1970)

This specification covers round, aluminum-clad steel wire used for mechanical reinforcement in the manufacture of aluminum conductors, aluminum-clad steel reinforced.

B 520 - 70, Tin-Coated, Copper-Clad Steel Wire for Electronic Application (Subcommittee VI) (effective Feb. 27, 1970)

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This specification covers tin-coated copper-clad steel wire for electronic application. Four classes of tin-coated copper-clad steel wire are covered as follows: Class T30HS nominal 30 percent conductivity, hard-drawn, Class T30A nominal 30 percent conductivity, annealed, Class T40HS nominal 40 percent conductivity, hard-drawn, and Class T40A nominal 40 percent conductivity, annealed.

B 524 - 70, Concentric-Lay-Stranded Aluminum Conductors, Aluminum Alloy Reinforced (ACAR-6201 Alloy) (Subcommittee VII) (effective April 13, 1970)

This specification covers concentric-lay-stranded conductors made from round EC-H19 aluminum wired and round aluminum Alloy 6201-T81 core wires for use as overhead electrical conductors.

B 531 - 70, Aluminum Alloy 5005 Rolled Rods for Electrical Purposes (Subcommittee VII) (effective May 29, 1970)

This specification covers aluminum alloy 5005 rolled rods 0.375 in. (9.52 mm) in diameter for drawing into wire for electrical conductors. Four tempers of rods are covered by this specification, designated as follows: 500-O, 5005-H12 and -H22, 5005-H14 and -H24, and 5005-H16 and -H26.

Adoption of Tentatives as Standards with Revisions:

B 286 - 70 (formerly B 286 - 64 T), Specification for Copper Conductors for Use in Hookup Wire for Electronic Equipment (Subcommittee IV) (effective March 19, 1970)

This specification was revised to make compatible with military requirements.

B 354 - 69 (formerly B 354 - 64 T), Definitions of Terms Relating to Uninsulated Metallic Electrical Conductors (Subcommittee I) (effective Dec. 19, 1970)

Definitions were added for Rated Strength, Cord, Annular Conductor; accepted new or revised definitions for "Concentric-Lay" Conductor, Conventional Concentric Conductor, Equilay Conductor, Unilay Conductor, Unidirectional Conductor, Parallel Core Conductor, Rope-Lay Conductor, Compact Round Conductor, Splice, and Nominal, adj.

B 355 - 69 (formerly B 355 - 64 T), Specification for Nickel-Coated Soft or Annealed Copper Wire (Subcommittee IV) (effective Dec. 19, 1969)

The conformance requirement for elongation were revised.

B 415 - 69 (formerly B 415 - 64 T), Specification for Hard-Drawn Aluminum-Clad Steel Wire (Subcommittee VI) (effective Sept. 19, 1969)

B 416 - 69 (formerly B 416 - 64 T), Specification for Concentric-Lay-Stranded Aluminum-Clad Steel Conductors (Subcommittee VI) (effective Sept. 19, 1969)

These specifications were revised to conform to present practices.

Revision of Standards, Immediate Adoption:

B 8 - 70 (formerly B 8 - 69), Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft (Subcommittee IV) (effective Feb. 27, 1970)

Section 6 was revised to permit compressed stranding.

B 231 - 69a (formerly B 231 - 69), Specification for Aluminum Conductors, Concentric-Lay-Stranded (Subcommittee VII) (effective Sept. 19, 1969)

Section 6 was revised to permit cold pressure welds in the individual wires of the outer 6-wire layer of 7-wire strands.

B 231 - 70 (formerly B 231 - 69a), Specification for Aluminum Conductors, Concentric-Lay-Stranded (Subcommittee VII) (effective Feb. 27, 1970)

Section 6 was revised to permit compressed stranding.

B 233 - 69 (formerly B 233 - 64), Specification for Aluminum Rolled Rods for Electrical Purposes (Subcommittee VII) (effective Oct. 17, 1969)

Table I was revised to decrease tensile strengths for various rod tempers in accordance with this specification.

B 279 - 70 (formerly B 279 - 60), Test for Stiffness of Bare Soft Square and Rectangular Copper Wire for Magnet Wire Fabrication (Subcommittee II) (effective March 6, 1970)

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Note 2 was expanded to permit shorter samples of large diameter specimens.

B 279 - 70a (formerly B 279 - 70), Test for Stiffness of Bare Soft Square and Rectangular Copper Wire for Magnet Wire Fabrication (Subcommittee II) (effective March 19, 1970)

Provision was made for a shorter sample length for weight determination.

B 298 - 70 (formerly B 298 - 64), Specification for Silver Coated Soft or Annealed Copper Wire (Subcommittee IV) (effective March 6, 1970)

Section 7 was revised.

B 298 - 70a (formerly B 298 - 70), Specification for Silver-Coated Soft or Annealed Copper Wire (effective March 19, 1970)

A simpler and more practical conformance requirement for elongation was added.

B 354 - 70 (formerly B 354 - 69) Definitions of Terms Relating to Uninsulated Metallic Electrical Conductors (Subcommittee I) (effective April 13, 1970)

Several definitions were revised.

B 397 - 69a (formerly B 397 - 69), Specification for Concentric-Lay-Stranded 5005-H19 Aluminum Alloy Conductors (Subcommittee VII) (effective Sept. 19, 1969)

This revision permits cold pressure welds in the individual wires of the outer 6-wire layer of 7-wire strands.

B 399 - 69a (formerly B 399 - 69), Specification for Concentric-Lay-Stranded 6201-T81 Aluminum Alloy Conductors (Subcommittee VII) (effective Sept. 19, 1969)

This revision permits welds in 7 wire strand.

Reapproval of Standards:

B 3 - 63 (1970), Specification for Soft or Annealed Copper Wire

B 9 - 64 (1970), Specification for Bronze Trolley Wire

B 33 - 63 (1970), Specification for Tinned Soft or Annealed Copper Wire for Electrical Purposes

B 47 - 64 (1970), Specification for Copper Trolley Wire

B 116 - 64 (1970), Specification for Figure-9

Deep-Section Grooved and Figure-8 Copper Trolley Wire for Industrial Haulage

B 172 - 64 (1970), Specification for Rope Lay-Stranded Copper Conductors Having Bunch-Stranded Members for Electrical Conductors

B 173 - 64 (1970), Specification for Rope Lay-Stranded Copper Conductors Having Concentric-Stranded Members, for Electrical Conductors

B 174 - 64 (1970), Specification for Bunch-Stranded Copper Conductors for Electrical Conductors

B 189 - 63 (1970), Specification for Lead-Coated and Lead-Alloy-Coated Soft Copper Wire for Electrical Purposes

B 226 - 64 (1970), Specification for Cored, Annular Concentric-Lay-Stranded Copper Conductors

B 230 - 60 (1970), Specification for Aluminum Wire, EC-H19, for Electrical Purposes Aluminum Conductors, Steel Reinforced (ASCR)

B 246 - 64 (1970), Specification for Tinned Hard-Drawn and Medium-Hard Drawn Copper Wire for Electrical Purposes

B 262 - 61 (1970), Specification for Aluminum Wire, EC-H16, or -H26, for Electrical Purposes

B 279 - 60 (1969), Test for Stiffness of Bare Soft Square and Rectangular Copper Wire for Magnet Wire Fabrication

B 298 - 64 (1970), Specification for Silver-Coated Soft or Annealed Copper Wire

B 314 - 60 (1970), Specification for Aluminum Wire for Communication Cable

B 323 - 61 (1970), Specification for Aluminum Wire, EC-H14 or -H24, for Electrical Purposes

B 342 - 63 (1970), Test for Electrical Conductivity by Use of Eddy Currents

Withdrawal of Standards:

B 245 - 63, Specification for Standard Weight Zinc-Coated (Galvanized) Steel Core Wire for Aluminum Conductors, Steel Reinforced (ACSR) (Subcommittee V) (effective Sept. 19, 1969)

B 261 - 63, Specification for Zinc-Coated (Galvanized) Steel Core Wire (with Coatings Heavier Than Standard Weight) for Aluminum Conductors, Steel Reinforced (ACSR) (Subcommittee V) (effective Sept. 19, 1969)

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These specifications were replaced by B 498-69.

The new and revised standards appear in the 1970 *Annual Book of ASTM Standards*, Parts 5 or 6.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee I on Editorial and Records (M. Puschel, chairman) has been active in coordinating the many new and revised specifications to ensure consistency not only with each other but with Society requirements and guides.

Subcommittee II on Methods of Test and Sampling Procedures (R. H. Lloyd, chairman) has completed a revision adding values for aluminum-clad steel in Table 2 of Specification B 258, for Diameters of Awg Sizes of Solid Round Wires, and Specification B 263, for Cross-Sectional Area of Stranded Conductors.

Subcommittee IV on Conductors of Copper and Copper Alloys (H. M. Specht, chairman) has completed a revision to Specification B 174, for Bunch-Stranded Copper Conductors, adding smaller sizes.

Task groups are considering the elongation requirements and the allowable spacing of joints in electronic hookup wire and preparing a new specification for high-conductivity, high-strength, copper-alloy hookup wire.

Subcommittee V on Conductors of Ferrous Metals (V. I. Kelley, chairman)—Task groups are considering possible conductivity values for galvanized and aluminized steel core wire, reviewing elongation requirements for galvanized steel core wire, and jointly with Subcommittee VII, are preparing a new specification for ultra-high-strength ACSR and considering the use of welds in finished ACSR core wire.

Subcommittee VI on Composite Conduc-

tors (A. W. Holmes and R. D. Pyle, chairman) Task groups are preparing new specifications for nickel-coated copper-clad steel wires for electronic applications and for copper-clad aluminum wire.

Subcommittee VII on Conductors of Light Metals (H. W. Adams and R. L. Gladwell, chairman)—Task groups are considering revised inspection requirements in various aluminum rod and wire specifications, permitting electric-butt cold-upset welds in stranded aluminum and aluminum alloy specifications, a revision of the specification for compact aluminum conductors to include other tempers, a revision of the tensile requirements for aluminum wires in compact aluminum or compact ACSR conductors, considering the need for specifications for dead-soft aluminum wire for general purposes and for extra-flexible aluminum conductor and preparing proposed new specifications for large solid aluminum conductors, for ACSR with aluminum-clad steel core, and for ACAR/5005.

Joint Task Groups—The Joint Task Groups on Glossary of Terms is actively working on the preparation of adequate definitions of a variety of terms used in Committee B-1 specifications. As approved, new definitions are included in Definition of Terms B 354.

COPANT—A Committee B-1 member served as one of the USA delegates to the Pan American Standard Commission (COPANT) Seminar on Electrical Conductors in Sao Paulo on Nov. 27-29, 1969.

Respectfully submitted on behalf of the committee,

A. H. SELLERS,
Chairman

R. E. LARSON,
Secretary

... (A. W. Holmes and R. D. Fyle, chair-
man) Task groups are preparing new speci-
fications for nickel-coated copper-clad steel
wires for electronic applications and for cop-
per-clad aluminum wire.

REPORT OF COMMITTEE B-2 ON NONFERROUS METALS AND ALLOYS

Committee B-2 on Nonferrous Metals and Alloys met on June 25, 1969, in Atlantic City, N. J. All technical subcommittees also held meetings during the Annual Meeting of the Society. Subcommittee B02.05 on Precious Metals also met at the ANSI Headquarters in New York City on Dec. 8, 1969. The Executive Group met during Committee Week in Cincinnati, Ohio, on Dec. 10, 1969.

The committee consists of 154 voting members of whom 76 are classified as producers, 35 as consumers, and 43 as general interest members. There are also 28 nonvoting members.

Audrey M. Bounds, who served the committee as both a secretary and a vice-chairman, was honored at the 1969 Annual Meeting as an Award of Merit winner.

Two faithful members of the committee resigned as subcommittee secretaries because of retirement: C. J. Snyder (B02.02 on Lead, Tin, Antimony, and Bismuth) and P. K. Anderson (B02.05 on Precious Metals).

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee B-2 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which became effective on the dates indicated:

New Standards:

The following specifications (Subcommittee B02.07) became effective Feb. 27, 1970:

B 509 - 70, Supplementary Requirements for Nickel Alloy Plate for Nuclear Applications

This specification provides supplementary requirements for nickel-copper alloy, nickel-

chromium-iron alloy and nickel-iron-chromium alloy plate for nuclear applications.

B 510 - 70, Supplementary Requirements for Nickel Alloy Rod and Bar for Nuclear Applications

This specification provides supplementary requirements for nickel-copper alloy, nickel-chromium-iron alloy, and nickel-iron-chromium alloy rod and bar for nuclear applications.

B 511 - 70, Nickel-Iron-Chromium-Silicon Alloy Hot Rolled and Cold Finished Bars

This specification covers hot-rolled and cold-finished bars, other than required for re-forging, including rounds, hexagons, squares, and shapes for general corrosion-resisting and high-temperature service.

B 512 - 70, Nickel-Iron-Chromium-Silicon Alloy Billets and Forging Bars

This specification covers heat-resisting alloy billets and bars to be used only for re-forging.

B 513 - 70, Supplementary Requirements for Nickel Alloy Seamless Pipe and Tube for Nuclear Applications

This specification provides supplementary requirements for nickel-copper alloy, nickel-chromium-iron alloy and nickel-iron-chromium alloy seamless pipe and tube for nuclear applications.

B 514 - 70, Welded Nickel-Iron-Chromium Alloy Pipe

This specification covers welded, cold worked, and annealed or solution treated average-wall nickel-iron-chromium alloy pipe for general corrosive service and heat-resisting applications.

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B 515 - 70, Welded Nickel-Iron-Chromium Alloy Tubes

This specification covers welded, cold worked, and annealed average wall nickel-iron-chromium alloy heat exchanger and condenser tube and tube for general corrosive service and heat-resisting applications.

B 516 - 70, Welded Nickel-Chromium-Iron Alloy Tubes

This specification covers welded cold-worked, and annealed or solution treated average-wall nickel-chromium-iron alloy heat-exchanger and condenser tube and tube for general corrosive service and heat-resisting applications.

B 517 - 70, Welded Nickel-Chromium-Iron Alloy Pipe

This specification covers welded, cold-worked, and annealed average-wall nickel-chromium iron alloy pipe for general corrosive service and heat-resisting applications.

B 518 - 70, Nickel-Chromium-Iron-Columbium-Molybdenum-Tungsten Alloy Rod and Bar

This specification covers nickel-chromium-iron-columbium-molybdenum-tungsten alloy hot-worked rounds, squares and rectangles, and cold-drawn rounds.

B 519 - 70, Nickel-Chromium-Iron-Columbium-Molybdenum-Tungsten Alloy Plate, Sheet, and Strip

This specification covers rolled nickel-chromium-iron-columbium-molybdenum-tungsten alloy plate, sheet and strip.

Tentatives Adopted as Standards with Revisions:

B 32 - 70 (formerly B 32 - 66 T), Specification for Solder Metal (Subcommittee B02.03) (effective May 29, 1970)

The specification was revised to update to present practices.

B 407 - 70 (formerly B 407 - 65 T), Nickel-Iron-Chromium Alloy Seamless Pipe and Tube (Subcommittee B02.07) (effective April 13, 1970)

The specification was updated to reflect current ASTM practice.

B 440 - 69 (Formerly B 440 - 66), Cadmium Metal (Subcommittee B02.04) (effective Oct. 17, 1969)

This specification was revised for clarification.

Revision of Standards:

B 6 - 70 (formerly B 6 - 67), Specification for Zinc Metal (Slab Zinc) (Subcommittee B02.04) (effective May 29, 1970)

This specification was updated to conform with ASTM practice and the state of the art.

B 161 - 70 (formerly B 161 - 61), Nickel Seamless Pipe and Tube (Subcommittee B02.07) (effective April 13, 1970)

The specification was revised to make the specification consistent with current ASTM practices.

B 162 - 69 (formerly B 162 - 61), Nickel Plate, Sheet, and Strip (Subcommittee B02.07) (effective Dec. 19, 1969)

This revision was to update the specification.

B 165 - 70 (formerly B 165 - 61), Nickel-Copper Alloy Seamless Pipe and Tube (Subcommittee B02.07) (effective April 13, 1970)

The specification was revised to make the specification consistent with current ASTM practices.

B 170 - 70 (formerly B 170 - 67), Oxygen-Free Electrolytic Copper Wire Bars, Billets, and Cakes (Subcommittee B02.01) (effective April 13, 1970)

The standard was updated to meet current practice.

B 224 - 70 (formerly B 224 - 58), Classification of Coppers (Subcommittee B02.01) (effective Jan. 22, 1970)

The classification of coppers was revised to include a number of additions and changes.

B 379 - 70 (formerly B 379 - 68), Phosphorus-Deoxidized Copper Wire Bars, Billets, and Cakes (Subcommittee B02.01) (effective March 19, 1970)

REPORT OF COMMITTEE B-2

This specification was revised to permit for type DLP a minimum phosphorus content of 0.003 percent by agreement between purchaser and supplier.

B 462 - 70 (formerly B 462 - 67), Forged or Rolled Chromium-Nickel-Iron-Molybdenum-Copper-Columbium Stabilized Alloy Pipe Flanges, Forged Fittings and Valves and Parts for Corrosive High Temperature Service (Subcommittee B02.07) (effective April 13, 1970)

The specification was updated to conform to present practices.

B 463 - 70 (formerly B 463 - 67), Chromium-Nickel-Iron-Molybdenum-Copper-Columbium Stabilized Alloy Plate, Sheet, and Strip (Subcommittee B02.07) (effective Jan. 22, 1970)

B 472 - 70 (formerly B 472 - 68), Chromium-Nickel-Iron-Molybdenum-Copper-Columbium Stabilized Alloy Billets and Bars for Reforging (Subcommittee B02.07) (effective Jan. 22, 1970)

B 473 - 70 (formerly B 473 - 68), Chromium-Nickel-Iron-Molybdenum-Copper-Columbium Stabilized Alloy Bar and Wire (Subcommittee B02.07) (effective January 22, 1970)

B 475 - 70 (formerly B 475 - 68), Chromium-Nickel-Iron-Molybdenum-Copper-Columbium Alloy Weaving Wire (Subcommittee B02.07) (effective Jan. 22, 1970)

The above four specifications were revised to include an updating of certain technical requirements by the manufacturers.

AMERICAN NATIONAL STANDARDS

The following standards have been approved during the year as American National Standards by the American National Standards Institute:

Subcommittee B02.01 on Refined Copper:

B 72 - 60; H23.9-1969, Fire-Refined Casting Copper

B 115 - 43 (1961); H23.10-1969, Electrolytic Cathode Copper

B 170 - 67; H23.10-1969, Oxygen-Free Electrolytic Copper Wire Bars, Billets, and Cakes

B 216 - 49 (1961); H23.12-1969, Fire-Refined Copper for Wrought Products and Alloys

B 442 - 67; H23.13-1969, Chemically Refined Copper Wire Bars, Cakes, Slabs, Billets, Ingots, and Ingot Bars

Subcommittee B02.02 on Refined Lead, Tin, Antimony, and Bismuth:

B 29 - 55 (1966); H40.1-1969, Pig Lead

B 237 - 52 (1961); H41.1-1969, Metallic Antimony

B 339 - 67; H42.1-1969, Classification for Pig Tin

Subcommittee B02.03 on Tin and Lead Alloys:

B 23 - 66; H39.1-1969, White Metal Bearing Alloys

Subcommittee B02.04 on Zinc and Cadmium:

B 418 - 67; H44.1-1969, Cast and Wrought Galvanic Zinc Anodes for Use in Saline Electrolytes

Subcommittee B02.07 on Refined Nickel and Cobalt, and Alloys Containing Nickel and/or Cobalt as Principal Constituents:

B 39 - 67; H34.5-1969, Nickel

B 127 - 61; H34.6-1969, Nickel-Copper Alloy Plate, Sheet, and Strip

B 160 - 61; H34.7-1969, Nickel Rod and Bar

B 162 - 61; H34.8-1969, Nickel Plate, Sheet, and Strip

B 164 - 61; H34.9-1969, Nickel-Copper Alloy Rod and Bar

B 168 - 63; H34.10-1969, Nickel-Chromium-Iron Alloy Plate, Sheet, and Strip

B 333 - 62; H34.11-1969, Nickel-Molybdenum Alloy Plate and Sheet

B 334 - 62; H34.12-1969, Nickel-Molybdenum-Chromium Alloy Plate and Sheet

B 335 - 62; H34.13-1969, Nickel-Molybdenum Alloy Rod

B 336 - 62; H34.14-1969, Nickel-Molybdenum-Chromium Alloy Rod

B 366 - 66; H34.15-1969, Factory-Made Wrought Nickel and Nickel Alloy Welding Fittings

B 423 - 66; H34.16-1969, Nickel-Iron-Chromium-Molybdenum-Copper Alloy Seamless Pipe and Tube

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B 424 - 66; H34.17-1969, Nickel-Iron-Chromium-Molybdenum-Copper Alloy Plate, Sheet, and Strip

B 425 - 66; H34.18-1969, Nickel-Iron-Chromium-Molybdenum-Copper Alloy Rod and Bar

B 443 - 66; H34.19-1969, Nickel-Chromium-Molybdenum-Columbium Alloy Plate, Sheet, and Strip

B 444 - 66; H34.20-1969, Nickel-Chromium-Molybdenum-Columbium Alloy Seamless Pipe and Tube

B 445 - 66; H34.21-1969, Nickel-Chromium - Iron - Columbium - Molybdenum - Tungsten Alloy Seamless Pipe and Tube

B 446 - 66; H34.22-1969 Nickel-Chromium-Molybdenum-Columbium Alloy Rod and Bar

Subcommittee B02.08 on Less Common Metals and Alloys:

B 357 - 66; H43.1-1969, Remelted Lithium in Ingot Form

ACTIVITIES OF SUBCOMMITTEES

Subcommittee B02.01 on Refined Copper (Howard Barkell, chairman)—Through its activities in the USA National Committee for Copper, the subcommittee continues its association with ISO and COPANT. Meetings of copper Committees ISO/TC 26 and COPANT C16 were held during the year. Several ISO/TC 26 documents were approved: Fire-Refined Tough Pitched Copper Refinery Shapes (DR1429), Phosphorus-Deoxidized Copper Refinery Shapes (DR1430), Electrolytic Cathode Copper, Electrolytic Tough-Pitch Copper (R431), and Fire-Refined High-Conductivity Tough-Pitch Copper Refinery Shapes (DR1428).

Subcommittee B02.02 on Lead, Tin, Antimony, and Bismuth (David M. Borcina, chairman)—The subcommittee is studying the need for specifications for bismuth and for lead sheet. A revision has been suggested to Specification B 237 - 52 (1969), for Metallic Antimony, to include antimony from secondary sources.

Specification B02.03 on Tin and Lead Alloys (P. R. White, chairman)—A new specification is being prepared for modern pewter alloys. The subcommittee is also considering the need for a specification on fluxes.

Subcommittee B02.04 on Zinc and Cadmium (K. A. Phillips, chairman)—The subcommittee continues its activity as USA National Committee for Zinc on ISO/TC 18. A representative attended a meeting of ISO/TC 18 Special Committee 1 (Methods of Analysis).

Subcommittee B02.05 on Precious Metals (Charles D. Cox, chairman)—New specifications are being prepared for refined gold and for refined platinum.

Subcommittee B02.07 on Refined Nickel and Cobalt and Alloys Containing Nickel and/or Cobalt as Principal Constituents (D. E. DeBord, chairman)—The following specifications are being revised: B 127 - 61, B 160 - 61, B 163 - 66, B 164 - 61, B 166 - 63, B 167 - 64, B 168 - 63, B 334 - 62, B 335 - 62, B 336 - 62, B 408 - 65 T, B 409 - 65 T, B 434 - 66 T, B 435 - 66 T, and B 436 - 66 T.

New specifications are being prepared for the following:

Nickel-Iron-Chromium-Silicon Alloy Plate, Sheet, and Strip

Nickel-Iron-Chromium-Silicon Seamless and Welded Pipe

Nickel-Iron-Chromium-Silicon Seamless and Welded Tube

Nickel-Molybdenum Seamless and Welded Pipe and Tube

Nickel-Molybdenum-Chromium Seamless and Welded Pipe and Tube

Nickel-Chromium-Molybdenum-Iron Rod and Bar

Nickel-Molybdenum-Chromium-Iron Seamless and Welded Pipe and Tube

Nickel-Molybdenum-Iron Seamless Condenser and Heat Exchanger Tubing

Nickel-Molybdenum-Chromium-Iron Rod and Bar

Nickel-Cobalt-Molybdenum-Iron Seamless and Welded Pipe and Tube

Nickel-Cobalt-Molybdenum-Iron Rod and Bar

Low Carbon, Low Silicon Nickel-Molybdenum-Chromium Seamless and Welded Pipe and Tube

Low Carbon, Low Silicon Nickel-Molybdenum-Chromium Plate, Sheet, and Strip

Low Carbon, Low Silicon Nickel-Molybdenum-Chromium Rod, Bar, and Forgings

Low Carbon, Low Silicon Nickel-Molybdenum-Chromium Fittings

REPORT OF COMMITTEE B-2

Nickel-Iron-Chromium-Molybdenum Plate,
Sheet, Bar, Wire, and Tubing

*Subcommittee B02.08 on Less Common
Metals and Alloys* (F. R. Lorenz, chairman)
—Specifications B 414 - 64 T for Unalloyed
Uranium Castings and B 420 - 64 T for
Unalloyed Uranium Melting Stock are being
revised. The subcommittee is considering the
need for specifications for beryllium.

Respectfully submitted on behalf of the
committee,

RICHARD W. HECKEL,
Chairman

ROBERT G. REDELFS,
Secretary

FOR THERMOSTATS AND FOR WIRING CONTACTS

Platinum Electrical Contact Alloy (Subcommittee IV) (effective April 13, 1970)

This specification defines 69 percent gold, 25 percent silver, 6 percent platinum alloy tubing, rod, wire- and sheet material for sliding electrical contacts.

Reapprovals of Standards:

B 63-49 (1970), Resistivity of Metallically Conducting Resistance and Contact Materials. Test for

B 70 - 56 (1970), Change of Resistance with Temperature of Metallic Materials for Electrical Heating, Test for

B 76-65 (1970), Accelerated Life Test of Nickel-Chromium and Nickel-Chromium-Iron Alloys for Electrical Heating

B 77-33 (1970), Thermoelectric Power of Electrical-Resistance Alloys. Test for

B 84-65 (1970), Temperature-Resistance Constants of Alloy Wires for Precision Resistors. Test for

B 114-45 (1970), Temperature-Resistance Constants of Sheet Materials for Shunts and Precision Resistors. Test for

B 182-49 (1970), Life Test of Electrical Contact Materials

B 277-55 (1970), Hardness of Electrical Contact Materials. Test for

B 344-65 (1970), Drawn or Rolled Nickel-Chromium and Nickel-Chromium-Iron Alloys for Electrical Heating Elements, Spec. for

B 362 - 65 (1970), Mechanical Torque Rate of Spiral Coils of Thermostat Metal, Test for

B 389-65 (1970), Thermal Deflection Rate of Spiral and Helical Coils of Thermostat Metal. Test for

ACTIVITIES OF SUBCOMMITTEES

Subcommittee I on Electrical Heating and Resistance Materials (R. M. Kelly, chairman)—At the request of Committee E-20, Subcommittee I has initiated a study on the development of a standard on iron-chromium-aluminum alloy for high-temperature heating material along the lines of Specification B 344 for nickel-chromium and nickel-chromium-iron alloys. The materials are generally being classified into four groups, according to the resistivity and composition and temperature limits. The committee reviewed Method B 70 and Specification B 344, proposing some minor changes. Method B 181 is to be deleted for inactivity and minor changes were made to Specification B 184. The committee noted with regret the impending retirement of C. W. Bowler as secretary.

Subcommittee III on Thermostat Metals (H. C. Wiedemann, chairman)—A supplement to *ASTM STP 288*, "Bibliography and Abstract on Thermostat Metals," was published.

The thermal conductivity of thermostat metals is being investigated. Since a determination of thermal conductivity by physical means is complicated, a mathematical approach is possible. Equations have been set up to calculate thermal conductivity, normal and parallel to the surface. The equations require the consideration of both components for a bimetal and all three for a trimetal. Committee E-1 has been contacted relative to the possibility of establishing a test method.

A summary of methods for "Determination of Bond in Thermostat Metals" was presented. Committee E-7 is responsible for nondestructive testing but no action is anticipated. JIS-C-2530, Japanese Industrial Standard for Bimetallic Sheet for Electrical Use, has a repeated bending test and a bending test to check for delamination—these are destructive tests. Committee D-30 on High Modulus Fibers and Their Composites is establishing a task group to investigate and possibly establish a specification on the determination of bond of laminated composites.

Future work of Subcommittee III will be the continuation of the Bibliography, improvement of Specification B 388, on Thermostat Metal Sheet and Strip, development

of thermal conductivity data on thermostat metals, and the bond strength and hardness of thermostat metals.

Subcommittee IV on Electrical Contact Materials (J. D. Kleis, chairman)—A talk was given by A. C. Snowdon of Cutler-Hammer on "The Use of D-C Test Systems to Measure Erosion, Welding, and Interruption Characteristics of High-Current Contacts" at the Subcommittee IV meeting on June 10, 1969.

Section A on Life Test (John Hopkins, chairman) is continuing to establish a method for evaluating the weld strength of various contact materials, under bounce-free and bounce-closure conditions using currents of 1 to 100 A. The material under evaluation is 72 percent Ag, 28 percent Cu. Upon gathering of sufficient data, a statistical analysis will be made. Concurrently a material containing 50 percent Ag-50 percent W has been evaluated by one laboratory. Some tests will be reported at the IEC meeting in Stockholm to be held in April 1970. Currently, Specification B 182-49, Life Test of Electrical Contact Materials, is being reviewed to determine whether or not it should be reappraised, altered, or deleted.

Section B on Physical Properties (W. H. Abbott, chairman) concerns itself with items related to the physical properties of electric contact materials. This includes determination of physical properties of electrical contact materials. Major activity for the year centered around determining sources of inaccuracy in the measurement of microhardness of precious metal contact materials. Initial work was done on 75 percent Au, 22 percent Ag, 3 percent Ni alloy. The major source of differences in readings taken by various laboratories was found to be in the optical techniques and lens calibration factors. This was done using statistical analysis. A second phase concerns itself with measuring the microhardness of Paliney 6 material at various laboratories. It has been determined that reading errors are a major source of differences between the results of different laboratories. This section is also reviewing Specification B 277-55, Test for Hardness of Electrical Contact Materials, and will report to the committee its decision.

Section C on Definition of Terms (J. N. Sanders, chairman)—Following publication

REPORT OF COMMITTEE B-4

in 1968 of a list of definitions in the green pages of the *Book of ASTM Standards*, Part 8, under the title, "Definition of Terms Relating to Electrical Contacts and Their Uses," additional terms have been defined. Progress is necessarily slow due to need to resolve the many variations of term definitions.

Section D on High Currents (L. Neely, chairman) is studying the operation of contacts at currents in excess of 100 A. Work is underway on silver-cadmium (85 percent Ag, 15 percent Cd) and fine silver wherein the welding characteristics will be evaluated.

Section E on Bibliography (Dr. E. I. Shobert, II, chairman)—Activity in this area will be shortly reactivated whereby the bibliography will be published, thanks to support by funds provided by the Holm Electric Contact Seminar.

Section F on Micro Contacts (K. E. Pitney, chairman)—The object of this section is to develop procedures for testing contact materials at low currents, forces, and voltages. A standard test apparatus employing crossed wire contacts (up to 0.022 in. diameters) and the four-wire contact voltage drop measuring technique is used. The current activities include exploration of cleaning methods, evaluation of electroplated contacts, and automatic and continuous contact resistance versus force measurements. Circuitry, devised by Mr. Lawson, was adopted to automatically apply contact force at a rate of 100 mg/s. The maximum contact force is 3 g. Wrought and plated gold is being evaluated. Contact resistance-force data and weld strength is reported on a log-log plot, with remarkable linearity and reproducibility.

Section G on Static Connectors (E. K. Camp, chairman)—The objectives of this section which are to develop evaluation methods, standards, and recommended practices for the use of static connectors and contacts, are being carried out by several task forces that are working in the following related areas to evaluate performance of: gold plate on a copper substrate, gold plate on substrates other than copper, study of field failure of connectors, evaluation of porosity in plated contact surfaces, and preparation of a guide on materials suitable for static contacts. An analysis was prepared covering NASA reported connector field failures. This analysis agrees with two former reports in-

dicating the majority of failures was caused by connector material deficiencies. Reports were given by the porosity task forces showing good agreement among the several laboratories reporting. A recommended practice for measurement of contact resistance was submitted for Committee B-4 letter ballot.

Section H on Sliding Contacts (E. W. Glossbrenner, chairman) is concerned with studying sliding, inseparable, metallic contacts. Progress in this study is resulting in the preparation of specifications. Proposed specifications for the Paliney 7 material are ready for letter ballot. The proposed specification on the material known as Ney Oro G has been reviewed and will be ready for letter ballot. Work is under way to develop a test fixture and the correlation of physical properties.

Section I on International Affairs (J. B. P. Williamson, chairman)—The Fifth International Research Symposium on Electric Contact Phenomena will be held May 4-8, 1970, in Munich, Germany. A Keil is the chairman.

Section J on Aluminum Connectors (D. A. Wycklundt, chairman) is now out of the necessary initial discussion stage and a definite program has been developed. The purpose of the section is to characterize and specify aluminum connectors. Initial efforts are being made to review corrosion tests on aluminum connectors with attention given to the important factors involved. Plated aluminum connectors (tin and silver plate) are being reviewed. Tests to determine porosity on tin-plated aluminum connectors are being considered.

Section K on Vacuum Contacts (D. E. Weston, chairman) is still in the organization phase. The program to be adopted will be such as to satisfy the objectives of the committee consisting of members who represent manufacturers of vacuum switches, contact material manufacturers, and users of vacuum switches. Initially, committee activities will be limited to make-break contacts operating in a vacuum requirement. Such basis characteristics as stability are being considered.

Respectfully submitted on behalf of the committee,

E. W. GLOSSBRENNER,
Chairman

R. M. SEARS,
Secretary

discussing the majority of failures was caused by connector material deficiencies. Reports were given by the porous task forces showing good agreement among the several laboratories reporting. A recommended practice for measurement of contact resistance was submitted.

REPORT OF COMMITTEE B-5 ON COPPER AND COPPER ALLOYS

Committee B-5 on Copper and Copper Alloys held meetings on March 3-5, 1969, in Simons Island, Ga., and on Sept. 8-10, 1969, in Montreal, Quebec, Canada. At both meetings, the Executive Subcommittee, Subcommittees I, II, III, IV, V, VI, VII, and several task groups met.

At the March meeting of Committee B-5, S. H. Butt and J. A. Ford of Olin Brass and Olin's Metals Research Laboratories, respectively, presented a paper entitled "Welded Heat Exchanger Tube and the Application of Copper Alloy No. 194 to Heat Exchanger Tube."

At the September meeting of Committee B-5, A. Fox of Bell Telephone Laboratories presented a paper entitled "Reversed Bending Fatigue Characteristics of Copper Alloy No. 510 (5% Tin Phosphor Bronze)." On the same program, R. R. Hart, also of Bell Telephone Laboratories presented a paper entitled "Mechanical Properties of Phosphor Bronze Strip and Their Variation Within Temper as Defined by ASTM Practice." The high quality of these presentations prompted Committee B-5 to sponsor them for publication in either *Materials Research and Standards* or *Journal of Materials* once clearance could be arranged with the authors' respective companies.

The USA National Committee for International Standardization on Copper and Copper Alloys, sponsored by Committee B-5, held two meetings in conjunction with scheduled B-5 meetings.

The committee consists of 109 voting members, of whom 46 are classified as producers, 31 as consumers, and 32 general interest. In addition, there are 13 nonvoting members for a total of 122.

As a result of the retirement of J. F. Lindsay, chairman of Committee B-5, the position of chairman was automatically filled by E. R. Jerome. In accordance with B-5

Bylaws, A. Raitzer was appointed first vice-chairman.

The officers elected for the ensuing two years are as follows:

Chairman, R. L. Esterline.

First Vice-Chairman, A. Raitzer.

Second Vice-Chairman, M. Silverstein.

Secretary, A. Cohen.

Membership Secretary, W. J. Anderson.

RECOMMENDATIONS ACCEPTED BY THE COMMITTEE ON STANDARDS

Subsequent to the 1969 annual report, Committee B-5 presented to the Society through the Committee on Standards the following recommendations which became effective on the dates indicated.

New Tentative Specification for:

B 508 - 69 T, Copper Alloy Strip for Flexible Metal Hose (Subcommittee I) (effective Dec. 19, 1969)

This specification covers annealed Copper Alloy Nos. 411 and 505 strip for the manufacture of flexible metal hose.

This new tentative specification appears in the 1970 *Annual Book of ASTM Standards*, Part 5.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee B-5 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which became effective on the dates indicated.

New Standard Specifications for:

B 492 - 70, Cast Copper-Nickel Ship Tailshaft Sleeves (Subcommittee V) (effective Jan. 22, 1970)

REPORT OF COMMITTEE B-5

This specification covers four types of sleeve castings in Copper Alloy No. 963 (80/20 copper-nickel). The types are: centrifugal chill cast, centrifugal sand cast, static chill cast, and sand cast.

B 505 - 70, Copper-Base Alloy Continuous Castings (Subcommittee V) (effective Jan. 22, 1970)

This specification covers continuously cast rod, bar, tube and shapes normally produced from 35 copper-base casting alloys.

B 506 - 70, Copper-Clad Stainless Steel Sheet and Strip for Building Construction (Subcommittee I) (effective Jan. 22, 1970)

This specification covers rolled copper-clad stainless steel sheet and strip in flat lengths or in rolls in thicknesses for roofing, flashing, the manufacture of gutters and conductor pipe, and for other general sheet metal work in building and construction.

Adoption of Tentative Specifications as Standard Without Revision:

B 198 - 69 (formerly B 198 - 65 T), Silicon Bronze and Silicon Brass Sand Castings (Subcommittee V) (effective Oct. 17, 1969)

B 433 - 69 (formerly B 433 - 65 T), Copper-Nickel Alloys in Ingot Form for Castings, (Subcommittee V) (effective Oct. 17, 1969)

Adoption of Tentative Specification as Standard with Revision:

B 148 - 70 (formerly B 148 - 68 T), Aluminum-Bronze Sand Castings (Subcommittee V) (effective Feb. 27, 1970)

A numbering system for the cast coppers and copper alloys was added.

Revision of Standard Specifications, Immediate Adoption

B 11 - 69 (formerly B 11 - 66a), Copper Plates for Locomotive Fireboxes (Subcommittee I) (effective Oct. 17, 1969)

The minimum copper plus silver content for Copper No. 110 was increased to 99.90 percent from 99.88 percent to make it agree with current standards.

B 16 - 69 (formerly B 16 - 66) Free-Cutting Brass Rod, Bar and Shapes for Use

in Screw Machines (Subcommittee II) (effective Oct. 17, 1969)

In Table 1 under rounds, hexagons, and octagons, half-hard temper, 1/2 in. and under, Footnote *b* was added after value of "7" in the elongation column. The footnote reads: "For material furnished in coils, the elongation shall be 4 percent minimum."

B 16 - 70 (formerly B 16 - 69) Free-Cutting Brass Rod, Bar, and Shapes for Use in Screw Machines (Subcommittee II) (effective Jan. 22, 1970)

In Table 2, for rectangles and squares changed the hardness range for all half hard tempers that now read Rockwell B35 to 60 to read Rockwell B35 to 70 (three sizes) to more reasonably resemble the product produced.

B 22 - 70 (formerly B 22 - 61), Bronze Castings for Bridge and Turntables (Subcommittee V) (effective Feb. 27, 1970).

B 30 - 70 (formerly B 30 - 59), Copper-Base Alloys in Ingot Form Sand Castings (Subcommittee V) (effective Feb. 27, 1970)

These specifications were revised to add a numbering system for the cast coppers and copper alloys.

B 42 - 70 (formerly B 42 - 66), Seamless Copper Pipe, Standard Sizes (Subcommittee IV) (effective May 29, 1970)

B 43 - 70 (formerly B 43 - 66), Seamless Red Brass Pipe, Standard Sizes (Subcommittee IV) (effective May 29, 1970)

These specifications were revised to standardize all pipe and tube marking requirements.

B 61 - 70 (formerly B 61 - 63), Stem or Valve Bronze Castings (Subcommittee V) (effective Feb. 27, 1970)

B 62 - 70 (formerly B 62 - 63), Composition Bronze or Ounce Metal Castings (Subcommittee V) (effective Feb. 27, 1970)

B 66 - 70 (formerly B 66 - 52), Bronze Castings in the Rough for Locomotive Wearing Parts (Subcommittee V) (effective Feb. 27, 1970)

B 67 - 70 (formerly B 67 - 52), Car and

REPORT OF COMMITTEE B-5

Tender Journal Bearings, Lined (Subcommittee V) (effective Feb. 27, 1970)

A numbering system for the cast coppers and copper alloys was added to these specifications.

B 88-69 (formerly B 88-66a), Seamless Copper Water Tube (Subcommittee IV) (effective Oct. 17, 1969)

The specification was revised to include introduction of manufacturer's marking option.

B 88-70 (formerly B 88-69), Seamless Copper Water Tube (Subcommittee IV) (effective Jan. 22, 1970)

Over-all review of tubular products packing and marking sections was made.

B 88-70a (formerly B 88-70), Copper Water Tube (Subcommittee IV) (effective May 29, 1970)

The specification was revised to standardize all pipe and tube marking requirements.

B 96-70 (formerly B 96-69), Copper-Silicon Alloy Plate and Sheet for Pressure Vessels (Subcommittee I) (effective May 29, 1970)

References to Copper Alloy No. 653 were deleted since there are no longer any producer sources.

B 97-70 (formerly B 97-69), Copper-Silicon Alloy Plate, Sheet, Strip and Rolled Bar for General Purposes (Subcommittee I) (effective May 29, 1970)

References to Copper Alloy No. 653 were deleted since there are no longer any producer sources.

B 111-69a (formerly B 111-69), Copper and Copper-Alloy Seamless Condenser Tubes and Ferrule Stock (Subcommittee IV) (effective Oct. 17, 1969)

Phosphorus content in Copper No. 142 was changed from 0.04 percent, max, to 0.015 to 0.040 percent.

B 122-69 (formerly B 122-66), Copper-Nickel-Zinc Alloy (Nickel Silver) and Copper-Nickel Alloy Plate, Sheet, Strip

and Rolled Bar (Subcommittee I) (effective Dec. 19, 1969)

The iron contents of Copper Alloys Nos. 710 and 715 were changed from 0.6 percent max, and 0.7 percent max. to 0.50 to 1.0 percent and 0.40 to 0.7 percent, respectively.

B 124-69 (formerly B 124-66a), Copper and Copper-Alloy Forging Rod, Bar, and Shapes (Subcommittee II) (effective July 18, 1969)

Tellurium Copper (Copper No. 145) was added, and the chemical composition of Copper Alloy 377 was changed.

B 124-69a (formerly B 124-69), Copper and Copper-Alloy Forging Rod, Bar and Shapes (Subcommittee II) (effective Oct. 17, 1969)

Copper Alloy No. 639 was added to this specification.

B 132-70 (formerly B 132-52), Leaded High-Strength Yellow Brass (Manganese Bronze) Sand Castings

B 143-70 (formerly B 143-61), Tin Bronze and Leaded Tin Bronze Sand Castings

B 144-70 (formerly B 144-52), High-Leaded Tin Bronze Sand Castings

B 145-70 (formerly B 145-63), Leaded Red Brass and Leaded Semi-Red Brass Sand Castings

B 146-70 (formerly B 146-52), Leaded Yellow Brass Sand Castings for General Purposes

B 147-70 (formerly B 147-63), High-Strength Yellow Brass (Manganese Bronze) and Leaded High-Strength Yellow Brass (Leaded Manganese Bronze) Sand Castings.

B 149-70 (formerly B 149-52), Leaded Nickel Brass (Leaded Nickel Silver) and Leaded Nickel Bronze (Leaded Nickel Silver) Sand Castings

These seven standards (Subcommittee V responsibility) (effective Feb. 27, 1970) were revised to add a numbering system for the cast copper and copper alloys.

B 151-70 (formerly B 151-66), Copper-Nickel-Zinc Alloy (Nickel Silver) and Copper-Nickel Rod and Bar (Subcommittee II) (effective Jan. 22, 1970)

REPORT OF COMMITTEE B-5

Copper Alloy No. 706 was added to this specification.

B 171 - 69 (formerly B 171 - 69), Copper-Alloy Condenser Tube Plates (Subcommittee I) (effective May 30, 1969)

The iron content of Copper Alloy No. 706 was changed from 0.50 to 2.0 percent to 1.0 to 1.8 percent in line with current industry standards.

B 176 - 70 (formerly B 176 - 62), Brass Die Castings (Subcommittee V) (effective Feb. 27, 1970)

B 194 - 69 (formerly B 194 - 66), Copper-Beryllium Alloy Plate, Sheet, Strip and Rolled Bar (Subcommittee I) (effective April 23, 1969)

This revised specification covers plate, sheets, strip and rolled bar manufactured from Copper Alloy Nos. 170 and 172.

B 198 - 70 (formerly B 198 - 69), Silicon Bronze and Silicon Brass Sand Castings (Subcommittee V) (effective Feb. 27, 1970)

These specifications were revised to add a numbering system for the cast copper and copper alloys.

B 248 - 69 (formerly B 248 - 68a), General Requirements for Wrought Copper and Copper-Alloy Plate, Sheet, Strip, and Rolled Bar (Subcommittee I) (effective Oct. 17, 1969)

The density of Copper Alloy No. 340 was changed from 0.305 to 0.306.

B 271 - 70 (formerly B 271 - 54), Copper-Base Alloy Centrifugal Castings (Subcommittee V) (effective Feb. 27, 1970)

A numbering system for the cast copper and copper alloys was added.

B 280 - 70 (formerly B 280 - 66a), Seamless Copper Tube for Air Conditioning and Refrigeration Field Services (Subcommittee I) (effective May 29, 1970)

This specification was revised to standardize all pipe and tube marking requirements.

B 283 - 69 (formerly B 283 - 66a), Copper and Copper-Alloy Die Forgings (Hot

Pressed) (Subcommittee II) (effective July 18, 1969)

Copper No. 145 was added to this specification.

B 292 - 70 (formerly B 292 - 56), Nickel-Tin Bronze Castings (Subcommittee V) (effective Feb. 27, 1970)

A numbering system for the cast copper and copper alloys was added.

B 302 - 70 (formerly B 302 - 66a), Threadless Copper Pipe (Subcommittee IV) (effective May 29, 1970)

This specification was revised to standardize all pipe and tube marking requirements.

B 306 - 70 (formerly B 306 - 66a), Copper Drainage Tube (DWV) (Subcommittee IV) (effective Jan. 22, 1970)

The packing and marking section was extensively revised in line with an over-all review of all tubular product specifications.

B 306 - 70a (formerly B 306 - 70), Copper Drainage Tube (DWV) (Subcommittee IV) (effective May 29, 1970)

This specification was revised to standardize all pipe and tube marking requirements.

B 359 - 70 (formerly B 359 - 66a), Copper and Copper Alloy Seamless Condenser and Heat Exchanger Tubes with Integral Fins (Subcommittee IV) (effective May 29, 1970).

Copper Alloy No. 442 was deleted since it is no longer produced. The scope was changed to read "This specification covers copper and copper alloy external helical integral finned seamless tubes for use in the surface condensers, evaporators, and heat exchangers."

B 369 - 69 (formerly B 369 - 68), Copper-Nickel Alloy Castings, (Subcommittee V) (effective July 18, 1969)

The chemical composition and welding sections were extensively revised.

B 369 - 70 (formerly B 369 - 69), Copper-Nickel Alloy Castings (Subcommittee V) (effective Feb. 27, 1970)

REPORT OF COMMITTEE B-5

A numbering system for the cast coppers and copper alloys was added.

B 395 - 70 (formerly B 395 - 66a), U-Bend Seamless Copper and Copper Alloy Heat Exchanger and Condenser Tubes (Subcommittee IV) (effective May 29, 1970)

Copper Alloy No. 442 was deleted since it is no longer produced.

B 433 - 70 (formerly B 433 - 69), Copper-Nickel Alloys in Ingot Form for Castings (Subcommittee V) (effective Feb. 27, 1970)

A numbering system for the cast copper and copper alloys was added.

B 447 - 69 (formerly B 447 - 68), Welded Copper Tube (Subcommittee IV) (effective Oct. 17, 1969)

The color coding requirements were deleted since they were not required in the parallel B 75 seamless tube specification.

B 467 - 69 (formerly B 467 - 68), Welded Copper-Nickel Pipe and Tube (Subcommittee IV) (effective Oct. 17, 1969)

The marking requirements in 19.2 were deleted since they are not required in the parallel B 466 seamless specification.

Reapproval of Standard Specifications:

B 22 - 61 (1969), Bronze Castings for Bridges and Turntables (Subcommittee V) (effective Oct. 17, 1969)

B 30 - 59 (1969), Copper-Base Alloys in Ingot Form for Sand Castings (Subcommittee V) (effective Oct. 17, 1969)

B 52 - 48 (1969), Phosphor Copper (Subcommittee V) (effective Oct. 17, 1969)

B 66 - 52 (1969), Bronze Castings in the Rough for Locomotive Wearing Parts (Subcommittee V) (effective Oct. 17, 1969)

B 67 - 52 (1969), Car and Tender Journal Bearings, Lined (Subcommittee V) (effective Oct. 17, 1969)

B 119 - 64 (1969), Cast Copper-Base Alloys (Subcommittee V) (effective Oct. 17, 1969)

B 132 - 52 (1969), Leaded High-Strength Yellow Brass (Manganese Bronze) Sand Castings (Subcommittee V) (effective Oct. 17, 1969)

B 143 - 61 (1969), Tin Bronze and Leaded

Tin Bronze Sand Castings (Subcommittee V) (effective Oct. 17, 1969)

B 144 - 52 (1969), High Leaded Tin Bronze Sand Castings (Subcommittee V) (effective Oct. 17, 1969)

B 145 - 63 (1969), Leaded Red Brass and Leaded Semi-Red Brass Sand Castings (Subcommittee V) (effective Oct. 17, 1969)

B 146 - 52 (1969), Leaded Yellow Brass Sand Castings for General Purposes (Subcommittee V) (effective Oct. 17, 1969)

B 147 - 63 (1969), High-Strength Yellow Brass (Manganese Bronze) and Leaded High-Strength Yellow Brass (Leaded Manganese Bronze) Sand Castings (Subcommittee V) (effective Oct. 17, 1969)

B 149 - 52 (1969), Leaded Nickel Brass (Leaded Nickel Silver) and Leaded Nickel Bronze (Leaded Nickel Silver) Sand Castings (Subcommittee V) (effective Oct. 17, 1969)

B 208 - 58 (1969), Tension Test Specimens for Copper-Base Alloys for Sand Castings (Subcommittee V) (effective Oct. 17, 1969)

B 271 - 54 (1969), Copper-Base Alloy Centrifugal Castings (Subcommittee V) (effective Oct. 17, 1969)

AMERICAN NATIONAL STANDARDS

The following standards have been approved during the year as American National Standards by the American National Standards Institute:

B 75 - 68; ANSI H23.3-1970, Specification for Seamless Copper Tube

B 98 - 69; ANSI H7.3-1970, Specification for Copper-Silicon Alloy Rod, Bar, and Shapes

B 99 - 69; ANSI H30.1-1970, Specification for Copper-Silicon Alloy Wire for General Purposes

B 100 - 69; ANSI H31.1-1970, Specification for Rolled Copper-Alloy Bearing and Expansion Plates for Bridges and Other Structural Uses

B 135 - 67; ANSI H36.1-1969, Specification for Seamless Brass Tube

B 140 - 68; ANSI H33.1-1969, Specification for Copper-Zinc-Lead (Leaded Red Brass or Hardware Bronze) Rod, Bars and Shapes

B 153 - 58 (1965); ANSI H39.2-1969, Method of Test for Expansion (Pin Test) of Copper and Copper Alloy Tubing

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- B 154-58 (1965);** ANSI H39.3-1969, Method of Mercurous Nitrate Test for Copper and Copper Alloys
B 251-68a; ANSI H23.4-1970, Specification for General Requirements for Wrought Seamless Copper and Copper-Alloy Tubes
B 315-69; ANSI H26.3-1970, Specification for Copper-Silicon Alloy Seamless Pipe and Tube
B 372-68; ANSI H37.1-1970, Specification for Seamless Copper and Copper-Alloy Rectangular Waveguide Tube
B 428-65; ANSI H39.4-1969, Method of Test for Angle of Twist in Rectangular and Square Copper and Copper Alloy Tube

All of the new and revised standards appear in the 1970 *Annual Book of ASTM Standards*, Part 5, or are issued as separate reprints.

SPECIAL RECOMMENDATIONS

Specifications:

B 6-67, B 29-66, B 39-67 and B 339-67—Recommendations were made that these specifications for Slab Zinc, Pig Lead, Nickel and Pig Tin be deleted from Part 5 of the *Book of ASTM Standards* for economy purposes.

Strength Properties—To avoid crowding the mechanical property tables, the committee recommended the adoption of "ksi" with two-digit entries over the existing "psi" with five-digit entries for all mechanical property table column headings involving strength (tensile and yield). A footnote relating "ksi = 1000 psi" for each table was to be introduced.

Tabular Data—It was recommended that a "dash" replace the word "to" in all tables.

General or Miscellaneous—The words "manufacturer or supplier" shall be substituted for "seller" and "purchaser" shall be substituted for "buyer."

Classification of Wrought Copper-Base Alloys—It was proposed that the "Proposed Classification of Wrought Copper-Base Alloys" be deleted from the green pages section of Part 5 of the *Book of ASTM Standards* as an economy measure.

ACTIVITIES OF SUBCOMMITTEES

Executive Subcommittee (J. F. Lindsay, chairman, January-June 30, 1969; E. R. Jerome, chairman July 1-present) held meetings on March 3, 1969, and Sept. 8, 1969. Items discussed were:

(1) Appointing an Awards Subcommittee for 1969 whose responsibility was to nominate suitable candidates for the Award of Merit, Honorary Membership, Service Certificates, and the National Medal of Science.

(2) Introduction of a clause in committee B-5 specifications similar to that found in Circular No. 477.

(3) Cleaning of Metal Surfaces. This subject was not accepted as an agenda item since skills necessary to develop specifications in this area were not available to Committee B-5 membership.

(4) Durability such as endurance, fatigue, or service life and validity of test procedures for the National Bureau of Standards Fire Research Section.

(5) Product Safety (Circular No. 481) which was felt to be best handled by organizations such as Underwriters Laboratories.

(6) Hydrogen embrittlement test for copper which was turned over to Subcommittee VI for action.

(7) Country of origin marking which was referred to Subcommittee IV for action since this requirement is presently restricted to tubular products.

(8) Copper No. 120 composition change which was referred to Subcommittee IV for action.

(9) The Unified Numbering System for Metals and Alloys.

(10) Copper and copper alloy filler metal which is now under sole jurisdiction of the American Welding Society.

(11) Appointment of a nominating committee to seek suitable candidates for the elected officer positions of Committee B-5.

Subcommittee I on Plate, Sheet and Strip (J. H. Mendenhall, chairman) held meetings on March 4, 1969, and Sept. 9, 1969.

Specification additions and changes recommended are: A new copper-cobalt-beryllium alloy specification; compositional changes to copper-silicon Alloys 651, 653, and 655; changes and additions to base-metal and clad-metal requirements. Other proposals

REPORT OF COMMITTEE B-5

being considered are: Addition of impurity limits for Alloy 614 in B 171; composition changes of Alloy 272 in B 36; removal of Alloy 653 from B 96 and B 97; addition of cupro-nickel 706 to B 122; addition of DLP copper 120 to B 152 and changing the format; change the composition of Alloy 510 for plate, sheet, and bar in specification B 103; change the lot size requirement in B 248; add Alloy 350 to B 121; change the composition of Alloy 353 in B 121; change a tolerance in Table 3 of B 248. Other technical questions under consideration by task groups include grain size uniformity, hydrogen embrittlement tests for copper, and metric conversions.

Subcommittee II on Rods, Bars and Shapes (W. M. Hinton, chairman) held meetings on March 5, 1969, and Sept. 10, 1969.

Metric system conversions were under development for Specifications B 12, B 98, B 138, B 139, B 140, B 150, B 151, B 187, B 196, B 283, B 411, and B 453.

Other items under consideration include: revision of B 196 to include copper-beryllium forgings, study of significant figures in B 249, study of dimensional tolerances of extruded rod, inclusion of Copper Alloy No. 342 (lead brass) in one or more specifications, adjustment in B 16 of half-hard temper for rod, hexagonal, and octagonal from $\frac{1}{2}$ in. to 1 in. inclusive, change of Footnote c in Table 1 of B 361, use of copper and copper alloys numbers in subcommittee specifications, and determining difference in terminology of mill and stock lengths in Subcommittee II specifications.

Subcommittee III on Wire and Wire Rod (W. H. Hawley, chairman)—Meetings were held on March 4, 1969, and Sept. 9, 1969.

Continued surveillance maintained over wire and wire rod standards. Specific activity involved technical changes in B 134. Work is also continuing relative to the introduction of metric equivalents in all Subcommittee III standards.

Subcommittee IV on Pipe and Tube (J. M. Keyes, chairman) held meetings on March 4, 1969, and on Sept. 9, 1969.

Proposed specifications for desalination tube; welded copper and copper alloy heat exchanger tubes are under development. Consideration is being given to revision of

the outside diameter tolerances and the addition of an average wall tube to Specification B 395, the deletion of Copper Alloy No. 442 from Specification B 359, the revision of the composition of Copper Alloy No. 270 in Specification B 135, and revision to Specification B 467 to make it acceptable to ASME.

Subcommittee V on Castings and Ingots for Remelting (M. L. Steinbuch, chairman)—Meetings were held on March 4, 1969, and Sept. 9, 1969.

A new alloy designation system for cast copper and copper alloys has been developed. Revisions have also been made to Specifications B 369, B 147, and B 30.

A task group is actively reviewing all casting and ingot specifications for updating, corrections, and insertion of alloy numbers.

Subcommittee VI on Methods of Test (L. B. Rosendahl, chairman) held meetings on March 4, 1969, and Sept. 9, 1969.

The table of conversion values for hardness as prepared by the task group of Subcommittee VI was approved for letter ballot to Subcommittee VI and Committee B-5 to be reviewed so that the table can be forwarded to Committee E-1 with recommendation that it be added to E 140. Standard test methods B 153, B 154, and B 428 were submitted for reapproval to Subcommittee VI and Committee B-5. A recommendation was made to have Committee B-5 sponsor presentation of a paper based on work on hardness conversions values to be prepared by V. E. Lysaght, with possible publication in a suitable ASTM publication. Work is continuing on developing a specification for nondestructive testing techniques for inspection of welded tubes. Task Group No. 612 was formed to prepare a test procedure for determining susceptibility of copper to hydrogen embrittlement and to bring this to the attention of Committees B-1, B-2, and F-1 to name liaison representatives to help with this work.

Subcommittee VII on Editorial and Publications (K. B. Bissell, chairman)—Meetings were held on March 4, 1969, and Sept. 9, 1969.

The subcommittee editorially reviews all Committee B-5 specifications including the annual edition of Part 5 of the *Book of ASTM Standards*. Additional work has been

REPORT OF COMMITTEE B-5

carried on in connection with the addition of metric units to B-5 specifications.

U. S. A. National Committee for International Standardization on Copper and Copper Alloy (W. H. Jennings, chairman)—Meetings were held on Jan. 30, 1969, March 4, 1969, and Sept. 8, 1969.

During the year, delegates attended meetings of Working Group I on Test Methods of ISO/TC 26 in London, April 28, 29, 30, 1969, of the working groups and plenary sessions of ISO/TC 26 in Stockholm, Sweden, June 26–30, 1969, and of COPANT Committee 16 in Mexico City, Aug. 11–23, 1969.

At the Stockholm meeting documents on testing of and chemical analysis of copper alloys were considered. Documents covering

specifications for wrought copper alloys and copper refinery shapes were considered. Several revised documents are being balloted on for approval by ISO member bodies.

At the Mexico City meeting several documents covering copper and copper alloy tubes, wires, rods, and flat products were discussed and several agreements reached which are to be incorporated in COPANT documents.

USANC is planning to host a COPANT Committee 16 meeting sometime in 1970.

Respectfully submitted on behalf of the committee,

E. R. JEROME,
Chairman

A. COHEN,
Secretary

REPORT OF COMMITTEE B-6 ON DIE-CAST METALS AND ALLOYS

Committee B-6 on Die-Cast Metals and Alloys and its subcommittees held two meetings during the last year: June 23 to 24, 1969, in Atlantic City, N. J., and on Jan. 28, 1970, in Philadelphia, Pa.

The committee consists of 76 voting members, of whom 36 are classified as producers, 14 as consumers and 26 as general interest members.

The following officers were elected to serve for the ensuing two years:

Chairman, T. E. Gregory
Vice-Chairman, E. V. Blackmun
Vice-Chairman, W. F. Joseph
Secretary, G. L. Armstrong
Ass't. Secretary, J. Lapin

ACTIVITIES OF SUBCOMMITTEES

Subcommittee I on Aluminum Die Casting Alloys (E. V. Blackmun, chairman) added Alloy SC102A to Specification B 85, for Aluminum Alloy Die Castings, and Specification B 179, for Aluminum Alloys in Ingot Form for Sand Castings, Permanent Mold Castings, and Die Castings.

Task Group H on Reference Radiographs for Aluminum and Magnesium Die Castings are assembling final results for aluminum reference radiographs.

Task Group on Effects of Copper in S12A Alloy has put all their data together and has submitted them to Committee B-6.

Task Group on Silicon Ranges for Aluminum Die Casting Alloys has submitted new ranges.

Task Group on the Die Casting Tolerances and Quality Requirements has gathered

much information and will present this at next meeting.

Subcommittee II on Zinc Die Casting Alloys (C. O. Zach, chairman) will add a footnote to Table 1 of Specification B 86 to allow the use of lower magnesium (0.015 percent) provided that the lead, cadmium, and tin do not exceed 0.003, 0.003, and 0.001 percent respectively.

Subcommittee V on Exposure and Corrosion Tests (H. J. Smith, chairman) has no action.

Subcommittee VII on Magnesium Die Casting Alloys (V. D. Sweeney, chairman) reported that work on magnesium radiographs was near completion.

Subcommittee VIII on Brass Die Casting Alloys (J. A. Wallace, chairman) has no action.

Subcommittee IX on Die Casting Processes (W. Babington, chairman)—R. Dunn presented a summary of the Force Materials Laboratory Report TR-69-223 on ferrous die casting research.

Subcommittee X on Cooperation with Pan American Standards (A. Y. Bethune, chairman) has no action.

This report has been submitted to letter ballot of the committee, which consists of 76 voting members; 00 numbers returned their ballots, of whom 00 voted affirmatively and 0 negatively.

Respectfully submitted on behalf of the committee,

D. H. KLEPPINGER,
Chairman.

G. LESLIE ARMSTRONG,
Secretary.

REPORT OF COMMITTEE B-7 ON LIGHT METALS AND ALLOYS

Committee B-7 on Light Metals and Alloys, held two meetings during the year: on June 24-26, 1969, in Atlantic City, N.J., and on Dec. 9-11, 1969, in Cincinnati, Ohio. The subcommittees, Executive Committee, and the USA National Committee for ISO/TC 79 on Light Metals and Alloys met in conjunction with the main committee.

The committee consists of 87 voting members, of whom 39 are classified as producers, 28 as consumers, and 20 as general interest members.

A By-Laws and Information Manual for Committee B-7, prepared by T. E. Gregory, was printed and the copies were distributed to the members.

H. D. Monsch was awarded a 1969 ASTM Award of Merit. Marc Darrin and L. L. Wyman were made honorary members of Committee B-7.

The committee deeply regrets to report the death of L. W. Murray. He was a member of the committee since 1956 and was vice-chairman of the committee from 1966-1968.

J. G. Kaufman was appointed to the awards committee. W. Jonsson was appointed chairman of Subcommittee B07.01 and K. E. Nelson was appointed chairman of Subcommittee B07.04. J. L. Weber, Jr. was appointed as liaison representative from Committee B-7 to Committee E-2.

The officers elected for the ensuing term of two years are as follows:

Honorary chairman, R. A. Harris.
Chairman, C. L. Carlson.
Vice-chairman (Producer), H. D. Monsch.
Vice-chairman (Consumer), T. E. Gregory.
Secretary, S. M. Brandt.
Assistant secretary, R. A. Bailey.

RECOMMENDATIONS ACCEPTED BY THE COMMITTEE ON STANDARDS

Subsequent to the 1969 annual report, Committee B-7 presented to the Society

through the Committee on Standards the following recommendation which became effective on the date indicated

Revision of Tentative Specification:

B 479 - 70 T (Formerly B 479 - 69 T), Annealed Aluminum-Alloy Foil for Flexible Barrier Applications (Subcommittee B07.03) (effective March 13, 1970)

The specification was revised to cover various degrees of foil surface wetness.

This revised specification will appear in the 1970 *Annual Book of ASTM Standards*, Part 6.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee B-7 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which became effective on the dates indicated:

Revision of Standard Specifications for:

B 90 - 70 (formerly B 90 - 69), Magnesium-Alloy Sheet and Plate (Subcommittee B07.04) (effective May 29, 1970)

Length and width tolerances were revised to agree with commercial practice.

B 107 - 70 (formerly B 107 - 69), Magnesium-Alloy Extruded Bars, Shapes and Tubes (Subcommittee B07.04) (effective May 29, 1970)

The specification was revised editorially and coverage was expanded to include extruded wire.

B 209 - 70 (formerly B 209 - 69), Aluminum-Alloy Sheet and Plate (Subcommittee B07.03) (effective April 13, 1970)

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Chemical composition limits and mechanical property limits were added to Tables 1 and 2 for Alloys 5652 and 5254. Mechanical properties were revised for Alclad 3005-0 and H14 sheet, the minimum yield strength for 3005-H12 was increased and the cladding schedule and mechanical properties were revised for Alclad 7178 sheet and plate.

B 210 - 70 (formerly B 210 - 68), Aluminum-Alloy Drawn Seamless Tubes (Subcommittee B07.03) (effective April 13, 1970)

Mechanical property requirements were added for 7075-0.

B 211 - 70 (formerly B 211 - 69), Aluminum-Alloy Bars, Rods, and Wire (Subcommittee B07.03) (effective April 13, 1970)

The maximum limits for silicon, iron, and chromium were reduced in Alloy 7075.

B 211 - 70a (formerly B 211 - 70), Aluminum-Alloy Bars, Rods, and Wire (Subcommittee B07.03) (effective May 29, 1970)

Mechanical property requirements were added for 2024-T62.

B 247 - 70 (formerly B 247 - 69), Aluminum-Alloy Die and Hand Forgings (Subcommittee B07.03) (effective April 13, 1970)

Mechanical property requirements were added for 7075-T7352 hand forgings and the maximum limits for silicon, iron, and chromium were reduced for 7075.

B 308 - 70 (formerly B 308 - 68), Aluminum-Alloy Standard Structural Shapes, Rolled or Extruded (Subcommittee B07.03) (effective April 13, 1970)

The minimum elongation requirements were reduced for 6061-T6.

B 316 - 70 (formerly B 316 - 68), Aluminum-Alloy Rivet and Cold Heading Wire and Rods (Subcommittee B07.03) (effective April 13, 1970)

The maximum limits for silicon, iron, and chromium were reduced for 7075.

B 345 - 70 (formerly B 345 - 68), Aluminum-Alloy Seamless Pipe for Gas and Oil Transmission and Distribution Piping Sys-

tems (Subcommittee B07.03) (effective April 13, 1970)

This specification was revised to update technical requirements and format.

The revised standards will appear in the 1970 *Annual Book of ASTM Standards*, Part 6.

Reapproval of Standard:

B 361 - 64 (1970) Factory Made Wrought Aluminum and Aluminum-Alloy Welding Fittings (Subcommittee B07.03)

RECOMMENDATIONS ON AMERICAN NATIONAL STANDARDS

The following standards have been submitted for approval during the year as ANSI Standards by the American National Standards Institute, Inc.:

B 80 - 69, Specification for Magnesium-Alloy Sand Castings

B 199 - 68, Specification for Magnesium-Alloy Permanent Mold Castings

B 404 - 68, Specification for Aluminum-Alloy Seamless Condenser and Heat-Exchanger Tubes with Integral Fins

B 429 - 69, Specification for Aluminum-Alloy Extruded Structural Pipe and Tube

B 483 - 69, Specification for Aluminum-Alloy Drawn Tubes for General Purpose Applications

B 491 - 69, Specification for Aluminum-Alloy Extruded Round Coiled Tubes for General Purpose Applications

The following standards, previously approved as ANSI Standards by the American National Standards Institute, Inc. were reapproved in their revised form:

B 179 - 69; ANSI H38.1-1969, (2nd edition) Specification for Aluminum Alloys in Ingot Form for Sand Castings, Permanent Mold Castings, and Die Castings

B 209 - 69; ANSI H38.2-1969, Specification for Aluminum-Alloy Sheet and Plate

B 211 - 69; ANSI H38.4-1969, Specification for Aluminum-Alloy Drawn Seamless Tubes

B 221 - 69; ANSI H38.5-1969, Specification for Aluminum-Alloy Extruded Bars, Rods, Shapes, and Tubes

B 234 - 69; ANSI H38.6-1969, Specification for Aluminum-Alloy Drawn Seamless

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Tubes for Condensers and Heat Exchangers

B 241 - 69; ANSI H38.7-1969, Specification for Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube

B 247 - 69; ANSI H38.8-1969, Specification for Aluminum-Alloy Die and Hand Forgings

The committee recommends the revisions of the following specifications, as covered in this report, be reapproved in their revised form:

ASTM Designation	ANSI No.
B 90 - 70	—
B 107 - 70	—
B 209 - 70	H38.2
B 210 - 70	H38.3
B 211 - 70	H38.4
B 247 - 70	H38.8
B 308 - 70	H38.10
B 316 - 70	H38.12
B 345 - 70	H38.13

ACTIVITIES OF SUBCOMMITTEES

Subcommittee B07.01 on Aluminum-Alloy Ingots and Castings (W. Jonsson, chairman) approved addition of Alloy ZG71B to Specifications B 179 and B 26. Proposed "sand cast" test bar casting design based upon Federal Specification QQ-A-601d failed letter ballot approval, and was returned to subcommittee for further discussion. Proposed permanent mold test bar casting design (in regard to Specification B 108) based upon AFS recommended practice with 0.505 in. diameter (D) and reduced section to accommodate a 5D gage length was approved for subcommittee letter ballot. Proposed allowances for iron and zinc pick-up and magnesium burn-out in aluminum-alloy ingot and castings (Specifications B 179, B 26, B 108, B 85) was approved for subcommittee letter ballot. Commercial aluminum alloy K01 is under review in Joint Task Group of Committees B-6-B-7 on Alloys and Specification Review. Task group on the review of quality standards was directed to include plaster and investment castings in their discussions. Definitions of sand castings (B 26), permanent mold castings (B 108), and die castings (B 85) are to be included in the respective specifications.

Subcommittee B07.03 on Aluminum-Alloy Wrought Products (H. D. Monsch, chairman; M. J. Weiss, secretary) revised Specifications B 209, B 210, B 211, B 247, B 308, B 316, B 317 and B 345. The nature of the revisions are given in a previous section of this report except for B 317. The requirement that a product have the capability of being electroplated was restored in Section 13 of B 317-68.

Two new task groups were established. One for the purpose of developing a new specification for ultrasonic inspection method for aluminum-alloy plate for pressure vessel applications and the second to consider proposed revisions to Specifications B 209 and B 241 and also proposed changes in the procedure for defining T42 and T62 temper requirements for heat-treatable alloys in all specifications which include such requirements.

Subcommittee B07.04 on Magnesium-Alloy Cast and Wrought Products (K. E. Nelson, chairman; H. G. Warrington, secretary) revised Specifications B 80, B 90, B 107, and B 199. Brief descriptions of the revisions for B 90 and B 107 are given elsewhere in this report. B 80-69 was revised by adding a definition for sand castings, increasing the minimum properties for ZE41A-T5 in Tables 2 and A3, and adding properties for ZE41A-T5 to Table A2. B 199-68 was revised by adding definitions for permanent mold castings and semi-permanent castings.

Definitions for all products in specifications under the jurisdiction of Subcommittee B07.04 are being worked out in conjunction with Subcommittee B07.01 of Committee B-7 and Committee B-6.

Work with Subcommittee E07.02 of Committee E-7 on Nondestructive Testing in the establishment of radiographic standards for magnesium-alloy castings containing zirconium continued during the year.

Subcommittee B07.05 on Testing (J. G. Kaufman, chairman; J. G. McArdle, secretary) directed its primary effort toward completion of the development of a proposed Supplement to ASTM Methods E 8, Tension Testing of Metallic Materials, to provide more specific information on the testing of aluminum and magnesium products. However, Subcommittee E01.04 of Committee

REPORT OF COMMITTEE B-7

E-1 ruled that it was inappropriate to provide procedures for specific alloys as a supplement to Methods E 8. Therefore, Subcommittee B07.05 has redirected its effort to prepare a separate "Method of Tensile Testing of Aluminum and Magnesium Alloys" and this will be the primary task for the coming year. Subcommittee B07.05 also reviewed and rejected a proposal by Subcommittee E01.04 of Committee E-1 to eliminate references in Methods E 8 to (a) the approximate nature of the extension-under-load method of determining yield strength, and (b) to the use of the offset method in referee testing.

Subcommittee B07.07 on Editorial and Codification (W. G. Snyder, chairman; L. J. Barker, secretary) reviewed the "Recommended Form for Committee B-7 Specifications" for conformance with the new edition of "Recommendations on Form of ASTM Standards" issued by ASTM Headquarters. No changes were required in the "Recommended Form for Committee B-7 Specifications".

Subcommittee B07.09 USA National Committee for ISO/TC 79 on Light Metals and Alloys (R. B. Smith, chairman) met once during the year, on June 25, 1969, in conjunction with meetings of ASTM Committee B-7, and sent delegates to a plenary meeting of ISO/TC 79 and to a meeting of one subcommittee as follows:

ISO/TC 79 on Light Metals and Alloys, June 2-6, 1969, in New York, N. Y., USA; E. F. Barkman, W. C. Cochran, R. P. Desitto, T. E. Gregory, A. W. Hess, Warren Jonsson, J. G. Kaufman, D. L. LaVelle, H. D. Monsch, A. A. Moore, W. E. Pilgrim, R. B. Smith, and W. G. Snyder.

ISO/TC 79/SC 2 on Anodized Aluminum, Feb. 19-21, 1969, in Paris, France; E. F. Barkman, W. C. Cochran.

The committee appreciates the financial support of the following organizations which provide the fund used to help cover transportation expenses of USA delegates to ISO/TC 79 meetings in other countries, the cost of the 1969 plenary meeting in the USA, and other operating expenses of the committee: Aluminum Association, American Die Casting Institute, Magnesium Association, and Telephone Group.

During 1969 the ISO Council accepted the

following 8 Draft ISO Recommendations as new ISO Recommendations which were published under the designations indicated. The USA vote was as shown below. The total number of published ISO Recommendations of ISO/TC 79 is now 37.

ISO/DR 1132 (79N369, N397) as ISO/R 952-1969, Tensile testing of light metal and light metal alloy tubes: *Affirmative*.

ISO/DR 1133 (79N370, N399) as ISO/R 953-1969, Drift expanding test on light metal and light metal alloy tubes: *Affirmative*.

ISO/DR 1134 (79N371, N401) as ISO/R 954-1969, Simple bend test for light metal and light metal alloy sheet and strip: *Affirmative*.

ISO/DR 1135 (79N373, N403) as ISO/R 955-1969, Flattening test on aluminum and aluminum alloy tubes: *Affirmative*.

ISO/DR 1136 (79N374, N405) as ISO/R 956-1969, Tensile test for light metal and light metal alloy wires: *Negative, but changed to affirmative after the North American proportional gage length of 4.5 $\sqrt{\text{area}}$ was added*.

ISO/DR 1137 (79N375, N407) as ISO/R 957-1969, Simple torsion test for aluminum and aluminum alloy wire: *Affirmative*.

ISO/DR 1138 (79N376, N409) as ISO/R 958-1969, Wrapping test for aluminum and aluminum alloy wire: *Affirmative*.

ISO/DR 1606 (79N412) as ISO/R 1118-1969, Spectrophotometric determination of titanium in aluminum and aluminum alloys (chromatropic acid method): *Affirmative*.

The following 3 Draft ISO Recommendations were approved by at least 60 percent of the ISO Member Bodies voting, and have been submitted to the ISO Council for approval as ISO Recommendations. The USA vote on them was affirmative.

ISO/DR 1750 (79N422), Photometric determination of soluble zirconium in magnesium and its alloys (alizarin sulphate method).

ISO/DR 1783 (79N420), Volumetric determination of zinc in magnesium and its alloys.

ISO/DR 1784 (79N424), Volumetric determination of zinc in aluminum and its alloys.

At the sixth plenary meeting of ISO/TC 79, held June 2-6, 1969, which was attended

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by 41 delegates from 8 participating member countries and 1 observer member country, the following 21 Draft Proposals were accepted with minor changes for submittal to the ISO General Secretariat as new Draft ISO Recommendations or revisions of published ISO Recommendations for letter ballot of all ISO Member Bodies.

6 Draft Proposals of Subcommittee 2, Anodized Aluminum:

Thickness measurement of anodic coatings by optical split beam microscope (79N479).

Measurement of breakdown potential (insulation value) of anodic coatings (79N480).

Measurement of the mass of anodic coatings by gravimetric method (79N472).

Test for sealing of anodic coatings by drop of dye after preliminary acid action (79N478).

Test for continuity of anodic coatings by copper sulfate test (79N471).

Test for light fastness of colored anodic coatings (79N473).

3 Draft Proposals of Working Group 3, Magnesium and Its Alloys, Cast or Wrought:

Chemical composition of Mg-Zn-Zr alloy castings (79N440).

Reference test bar for magnesium alloy sand castings (79N460).

Revision (79N453) of ISO/R 121-1957 to add mechanical properties of Mg-Al-Zn sand castings (79N461).

4 Draft Proposals of Working Group 4, Wrought Aluminum and Wrought Aluminum Alloys:

Revision of ISO/R 209-1968, 2nd edition, to add chemical composition of Al-Zn6MgCu alloy (79N465), and to revise the minimum chromium limit of Al-Mg1SiCu to agree with the USA limit.

Revision of ISO/R 826-1968 to add mechanical properties of Al-Zn6MgCu rolled products (79N462), and to add mechanical properties for more strain hardened tempers of rolled products (79N469).

Revision of ISO/R 827-1968 to add mechanical properties of Al-Zn6MgCu extruded products (79N459).

Selection of test samples for wrought aluminum and aluminum alloys (79N458).

3 Draft Proposals of Working Group 5, Cast Aluminum Alloys:

Reference test bar for aluminum alloy sand castings (79N466).

Mechanical properties of aluminum alloy sand castings (79N457).

Reference test bar for aluminum alloy permanent mold castings (79N456).

3 Draft Proposals of Working Group 6, Methods of Mechanical Testing:

Revision (79N352) of ISO/R 191-1961, Brinell Hardness Test.

Revision (79N352) of ISO/R 192-1961, Vickers hardness test.

Shear test for aluminum and aluminum alloy rivet wire and rivets (79N429).

2 Draft Proposals of Working Group 7, Symbols:

Designation code for light metals and their alloys (79N415).

Temper designations for light metals and their alloys (79N414) with addition of an appendix explaining subdivisions of the H temper.

Respectfully submitted on behalf of the committee,

C. L. CARLSON,
Chairman

S. M. BRANDT,
Secretary

REPORT OF COMMITTEE B-8 ON ELECTRODEPOSITED METALLIC COATINGS AND RELATED FINISHES

Committee B-8 on Electrodeposited Metallic Coatings and Related Finishes held only one meeting in the period covered by this annual report because of a rearrangement of the schedule of meetings caused by the change of date of the ASTM Annual Winter Meeting. This meeting was held on Dec. 11, 1969, in Cincinnati, Ohio. Two meetings are scheduled during the next report period.

The voting membership of the committee totals 198, of whom 91 are classified as producers, 24 as consumers, and 83 as general interest; there are also 9 consulting members.

Certificates of Appreciation were presented to retired member, August Mendizza and retired secretary, Dr. George Bauer.

Past and Honorary Chairman, Clarence Sample, recently retired, was elected to Honorary Membership on Committee B-8.

A special task group under R. W. Polleys is working on a revision of the bylaws of Committee B-8.

Officers and executive committee members-at-large were elected with the following results.

Officers:

Chairman, E. B. Saubestre.
Vice-chairman, H. A. Kahler.
General secretary, R. J. Clauss.
Membership secretary, R. G. Baker.

Executive Committee Members-at-Large:

For term ending in June, 1971, R. DuBois.
For term ending in June, 1972, F. Ogburn.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee B-8 submitted the following rec-

ommendations to the Society for action under the Interim Procedure for Standards, which became effective on the dates indicated:

New Standards:

B 499 - 69, Method for Measurement of Coating Thicknesses by the Magnetic Method: Nonmagnetic Coatings on Magnetic Basis Metals (Subcommittee B08.10) (effective July 18, 1969)

This, and other methods for testing thicknesses of electrodeposited metallic coatings, will soon replace completely Methods A 219, Test for Local Thickness of Electrodeposited Coatings.

B 503 - 69, Recommended Practice for Use of Copper and Nickel Electroplating Solutions for Electroforming (Subcommittee B08.07) (effective Oct. 17, 1969)

This recommended practice is a useful guide for electroplaters and engineers who are familiar with ordinary electroplating practice, but unacquainted with the specific concepts and more precise requirements for electroforming.

B 504 - 70, Method of Test for Measurement of the Thickness of Metallic Coatings by the Coulometric Method (Subcommittee B08.10) (effective Jan. 22, 1970)

B 507 - 70, Recommended Practice for Design of Articles to be Plated on Racks (Subcommittee B08.01) (effective Mar. 6, 1970)

This recommended practice deals largely with plate distribution as related to the contour of an article being plated.

B 529 - 70, Method for Measurement of Coating Thicknesses by the Eddy-Current

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Test Method: Nonconductive Coatings on Nonmagnetic Basis Metals (Subcommittee B08.10) (effective April 13, 1970)

This method covers the use of eddy-current instruments for the nondestructive measurement of the thickness of a nonconductive coating on a nonmagnetic basis metal.

B 530 - 70, Method for the Measurement of Coating Thicknesses by the Magnetic Method: Electrodeposited Nickel Coatings on Magnetic and Nonmagnetic Substrates (Subcommittee B08.10) (effective April 13, 1970)

This method covers the use of magnetic instruments for the nondestructive measurement of the thickness of an electrodeposited nickel coating on either a magnetic or nonmagnetic substrate.

Adoption of Tentative as Standard Without Revision:

B 136 - 68 (formerly B 136 - 63T), Method of Test for Resistance of Anodically Coated Aluminum to Staining by Dyes (Subcommittee B08.06) (effective Sept. 19, 1969)

This somewhat controversial Method was advanced to Standard to keep it in effect while revision is in process.

Adoption of Tentative as Standard With Revision:

B 454 - 70 (formerly B 454 - 67T), Specification for Mechanically Deposited Coatings of Zinc on Ferrous Materials (Subcommittee B08.04) (effective Jan. 22, 1970)

The revision of this specification involves enlarging the content and changing the title to: Specification for Mechanically Deposited Coatings of Cadmium and Zinc on Ferrous Materials.

Revision of Standards, Immediate Adoption:

B 252 - 69 (formerly B 252 - 53 (1961)), Recommended Practice for Preparation of Zinc Alloy Die Castings for Electroplating (Subcommittee B08.02) (effective July 18, 1969)

This recommended practice has been extensively revised both editorially and to bring its technical content up to date and in line

with current practice. The title was changed slightly to: Recommended Practice for Preparation of Zinc Alloy Die Castings for Electroplating.

B 254 - 70 (formerly B 254 - 53 (1961)), Recommended Practice for Preparation of and Electroplating on Stainless Steel (Subcommittee B08.02) (effective April 13, 1970)

Most of the changes in this revision are editorial in nature, but minor changes in technical content, particularly in the appendixes, have been made to up-date the practice.

B 431 - 69 (formerly B 431 - 67), Recommended Practice for Processing of Mandrels for Electroforming (Subcommittee B08.08) (effective Dec. 19, 1969)

This revision consists of the addition of a new Section 8 and a corresponding revision of the Scope. The titles of Sections 4 and 7 were revised editorially.

AMERICAN NATIONAL STANDARDS

The following standards have been approved during the year as American National Standards by the American National Standards Institute:

B 252 - 69; ANSI G53.11-1970, Recommended Practice for Preparation of Zinc Alloy Die Castings for Electroplating

R 368 - 68; ANSI G118.3-1970, Method for Copper-Accelerated Acetic Acid-Salt Spray (Fog) Testing (CASS Test)

B 456 - 67; ANSI G53.15-1970, Specifications for Electrodeposited Coatings of Nickel Plus Chromium

B 457 - 67; ANSI G53.16-1970, Method for Measuring Impedance of Anodic Coatings on Aluminum

B 480 - 68; ANSI G53.17-1970, Recommended Practice for Preparation of Magnesium and Magnesium Alloys for Electroplating

B 481 - 68; ANSI G53.18-1970, Recommended Practice for Preparation of Titanium and Titanium Alloys for Electroplating

B 482 - 68; ANSI G53.19-1970, Recommended Practice for Preparation of Tungsten and Tungsten Alloys for Electroplating

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ACTIVITIES OF SUBCOMMITTEES

Subcommittee B08.01 on Terminology, Editing and Public Relations (R. W. Polleys, chairman):

Section B08.01.01, Editorial, under F. A. Lowenheim, has been enlarged from three to four members and has handled a heavy work load during the year.

Section B08.01.02 on Terminology, under E. B. Saubestre, has been inactive because of the delay in completion of the ISO English definitions. These are now available, and will enable the section to conduct the planned reexamination of the G-1, B-8, and MIL-1219 glossaries.

Section B08.01.03, Liaison, also under E. B. Saubestre, has maintained contact with ASEP through Section B08.02.03 of Subcommittee B08.02.

A task force under C. F. Waite is making an effort to get agreement (presently among members of the Executive Committee) on some designations for service conditions which would be generally applicable to Committee B-8 plating specifications.

Subcommittee B08.02 on Substrate Preparation (C. A. Holden, chairman)—Recommended Practices for Preparation of Low-Carbon Steel (B183) and High-Carbon Steel (B242) for Electroplating are being revised. Recommended Practices for Preparation of Lead and Lead Alloys (B319) and for Preparation of Iron Castings (B320) for Electroplating were referred for letter ballot in Committee B-8 for reapproval without change. A proposed revision of Recommended Practice B 281-58, for Preparation of Copper and Copper-Base Alloys for Electroplating, is nearly ready for letter balloting in the subcommittee.

Interest continues at a high level in Section B08.02.03 on Preparation for Plating on Nonconductors. A Recommended Practice for Evaluation of the Appearance of Plated Plastic Surfaces has been successfully letter balloted in Committee B-8 and submitted to the Society. Results of round-robin tests on thermal cycling were varied and out of statistical control. Further work is required. A document will be prepared referencing suitable methods for determining coating thicknesses on nonconducting substrates.

Proposed recommended practices for preparation of molybdenum for plating,

chromium plating on chromium, preparation for plating on nickel alloys, and preparation for plating on high-strength steels are in various stages of development. Interest has again been expressed in the preparation of aluminum for plating by methods other than the zincate method.

A new task group has been established under the chairmanship of Joe Andrus to prepare a recommended practice for the preparation of a substrate for electroless nickel plating.

Subcommittee B08.03 on Decorative Cu-Ni-Cr Coatings (V. J. Cassidy, chairman)—The report on exposure program No. 6 (Cu-Ni-Cr on aluminum) is undergoing a second revision and will be resubmitted to letter ballot of the subcommittee in early 1970. Program No. 8 (duplex Ni + microcracked and microporous Cr on steel) was reviewed. Poor adhesion was noted on many of the control panels when they were tested in the laboratory and, because of this, it was felt that final conclusions could not be drawn. The data without conclusions will be circulated for letter ballot in the subcommittee early in 1970.

Corrosion testing of copper-nickel-chromium coatings on plastic substrates will be conducted by Subcommittee B08.03.

Program No. 9 (Ni-Cr on steel to validate service conditions 3 and 4 in B 456-67) has not been started, pending completion of financing. ILZRO Program No. 8 on zinc die castings is similar to our program No. 9 on steel, and we will be permitted to use ILZRO data.

A program No. 10 has been designed to determine the effect of four preparatory processes for aluminum on the protective value of Ni-CR deposits subsequently applied. Three aluminum alloys are involved.

An effort is being made to measure the corrosivity of our exposure sites using unprotected cold rolled steel panels.

Planning for round-robin analysis for sulfur in semi-bright nickel deposits has been taken over by J. K. Long of Harshaw Chemical.

The proposed Recommended Practice for Rating Electroplated Panels Subjected to Atmospheric Exposure is being letter balloted in Committee B-8.

The Recommended Practice for the Appli-

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cation of Organic Coatings to Chromium Plate has not yet been revised and rebaloted in Subcommittee B08.03, but this should take place in the near future.

A new task group has been formed to do the necessary testing and correlation of the EC corrosion test with future exposure programs on Ni-Cr coatings.

Subcommittee B08.04 on Zinc and Cadmium Coatings (C. W. Ostrander, chairman)—Work continues on the revision of A 164-55 (1961) and A 165-55 (1961), specifications for electrodeposited coatings of zinc and cadmium on steel. Progress is also reported on a proposed specification for vacuum-deposited cadmium coatings.

Subcommittee B08.05 on Coatings of Tin, Lead and Their Alloys (R. M. MacIntosh, chairman)—The revision of Specification B 200-60, for Electrodeposited Coatings of Lead on Steel, and the inclusion of lead-tin alloy deposits up to 15 percent tin have been essentially completed in the subcommittee and were formally referred to Committee B-8 for letter ballot.

Some progress has been made on the proposed specifications for tin, tin-lead, and tin-nickel coatings. There is some question if interest in a specification for immersion tin deposits warrants the effort, and a decision was made to hold the matter in abeyance for the time being.

The report on the solderability of tin-coated brass was published in the July 1969 issue of *Plating*.

Subcommittee B08.06 on Anodic and Conversion Coatings on Aluminum and Magnesium (W. C. Cochran, chairman)—Progress was made in drafting a proposed specification for anodic coatings on aluminum. In addition to minimum requirements for various types of anodic coatings, the specification will include definitions of terms and service conditions, and a guide for selection of coating grades for different service requirements.

A proposed revision is underway for Method B 136-69, Test for Resistance of Anodically Coated Aluminum to Staining by Dyes. Prior treatment of the coating with nitric acid will be proposed for making this dye stain test more discriminating.

A proposed method of test for resistance of anodic coatings to grit blast-type abrasion is ready for subcommittee balloting, and a task group was established to complete a

second proposed method employing the Taber Abraser.

The proposed method of FACT (Ford Anodized Aluminum Corrosion Test) testing has been submitted to letter ballot in Committee B-8. Methods for the resistance of anodic oxide coatings on aluminum to dissolution by acids are currently under consideration by the subcommittee.

Members of Subcommittee B08.06 were given an opportunity to comment on MIL-C-5541B, Chemical Conversion Coating (Film) Materials for Aluminum and Aluminum Alloys, and MIL-C-81706, Chemical Conversion Coatings (Film) for Aluminum and Aluminum Alloys.

Subcommittee B08.07 on Electroforming (F. X. Carlin, chairman)—Work is continuing on test methods for measuring the properties of electroformed articles, and a section is continuing to compile literature on electroforming.

Subcommittee B08.08 on Engineering (non-decorative) Coatings (C. L. Fuelling, chairman)—A number of subjects for future work are being considered. Among them are copper, tin, and bronze plate on steel for selective carburizing and nitriding; electroless copper plating for selective phosphating; hard chromium and nickel deposits, electroless nickel; and brush plating.

Subcommittee B08.09 on Precious Metal Coatings (A. Korbelak, chairman)—Some criticism of Specification B 588, for Electrodeposited Coatings of Gold for Engineering Uses, has developed and, after some discussion, it was suggested that a group be formed to update and improve it.

Progress is being made in accumulating information on existing silver standards.

Work on hardness testing has been transferred to Subcommittee B08.10. Assistance is being solicited in investigating the need for documentation on solderability, conductivity and resistance to abrasion and wear.

A section formed to investigate causes for non-reproducibility of measurements of gold coating thicknesses has been dissolved. The problem was caused by differences between the density of the gold coating on the standards and those being measured.

A request from ISO/TC 107 WG 3 for specifications used in the USA for industrial and decorative silver and gold coatings was discussed.

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Subcommittee B08.10 on General Test Methods (L. C. Borchert, chairman)—Methods A 219 - 58, Test for Local Thickness of Electrodeposited Coatings, is being phased out by newer methods, several of which have already been accepted by the Society. A 219 - 58 has been editorially modified to refer to the new methods to the extent possible. The spot test method for decorative chromium, and the dropping tests for cadmium and zinc, and possibly lead, will be rewritten in a new separate document.

A proposed Method of Test for the Peel Strength of Metal Plated Plastics has been balloted in Committee B-8 and is nearly ready for submission to the Society.

Thickness test methods utilizing beta-ray backscatter and X-ray fluorescence are in preparation.

There has been considerable dissatisfaction regarding the designation of the microscopical thickness test method as a referee method. A round-robin test series on tin and nickel deposits is planned to clarify the matter.

In preparation is a draft of guidelines on the adhesion tests in use today.

A document is in preparation describing the measurement of internal stress with the spiral contractometer.

The new plated specimens to be used in the round-robin tests to determine the effect of the grade of kaolin used on the corrosivity of the Corrodokote test are being distributed to the participants.

INTERNATIONAL STANDARDIZATION ORGANIZATION (ISO) ACTIVITIES

ISO/TC 79 on Light Metals and Alloys—W. Cochran (along with E. Barkman) attended a meeting of WG/2 on Anodized Aluminum in Paris, France, in February 1969. Eight documents were approxed for submission to the ISO/TC 79 Plenary Committee. The latter met in New York City in June 1969, again with Cochran and Barkman in attendance. All documents but one were approved for submission to the ISO Central Secretariat in Geneva. Of particular interest to ASTM is that two of these documents (Measurement of Mass of Oxide Coatings on Aluminum and Measurement of Breakdown Voltage of Oxide Coatings on Aluminum) encompass ASTM B 137 and ASTM B 110.

Other tests include check of continuity of thin coatings by the copper sulfate method; determination of the lightfastness of colored oxide coatings on aluminum; check of sealing (dye drop test with prior use of HNO₃); and measurement of thickness of oxide coatings on aluminum by the optical split-beam microscope.

Future work on anodic coatings on aluminum contemplates the following: hardness, abrasion resistance, flexibility, thickness, continuity, impedance, admittance; resistance to acids, temperature, light, weather, and corrosion; methods for measuring appearance (reflectance, image clarity, color, etc.); and a designation system for anodized finishes. Two methods for measuring coating thickness developed by ISO/TC 107/WG 2 will be reviewed by ISO/TC 79 WG 2. These are methods of determination of coating thickness by Microscopical Method and Eddy-Current Methods.

USA Committee for ISO/TC 107 on Metallic and Other Non-Organic Coatings (E. B. Saubestre, chairman)—The Executive Committee of B-8 is the nucleus of this committee.

Working Group 1 on Terminology—E. B. Saubestre reported that the work of WG 1 is complete, and no future meetings are envisaged.

Working Group 2 on Methods of Inspection and Coordination of Tests—B. Joffe reported on the work of WG 2. A meeting was held in Torino, Italy, in December 1969, attended by Joffe (delegation chairman), Safranek, and Saubestre. Work on eddy-current methods, and measurements of nickel coatings on magnetic and nonmagnetic substrates submitted by the U.S. delegation has been completed, and in many ways, follows corresponding ASTM documents. The U.S. delegation will furnish the Secretariat of WG 2 with a draft for thickness measurements by beta backscatter and X-ray fluorescence. Work on solderability testing and anti-tarnish tests for silver coatings was referred to WG 3. Future work will be concerned with sampling and statistical methods for thickness measurements, the original German document having been tabled. The United States will furnish Germany with MIL Specification information, prior to a redrafting of the document. Another future item is an

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adhesion document based on work originally submitted by the United Kingdom.

Working Group 3 on Electrodeposited Coatings—W. Safranek reported on the work of WG 3. A meeting was held in London, England, in November 1969, attended by Safranek (delegation chairman), Joffe, and Saubestre. Safranek noted that Joffe and Saltonstall had attended the plenary session of ISO/TC 107 in Paris, France, in April 1969. The details appear in the ASTM Committee B-8 Annual Report for 1969. At the London meeting, amendments were proposed for the Ni and Ni-Cr documents to cover microporous Cr along with microcracked Cr for several service conditions. The General Secretariat will determine whether these changes are editorial or require further balloting. On the basis of work done in ILZRO Program 8 on zinc die castings, the United States delegation proposed further changes for Service Conditions 3 and 4, which were tabled until the next meeting for further study.

The United Kingdom delegation presented proposed documents on gold and silver plating. After considerable discussion, it was decided to rework these documents. In general, consensus was to issue separate documents for engineering (or electronic) use on the one hand and decorative applications on the other. The United States delegation agreed to supply the BSI with applicable United States legal regulations by the end of March 1970.

This report has been submitted to letter ballot of the committee which consists of 198 members; 113 members returned their ballots, of whom 112 voted affirmatively and 1 negatively. (The negative vote was resolved by making a correction.)

Respectfully submitted on behalf of the committee,

R. B. SALTONSTALL,
Chairman

R. J. CLAUSS,
Secretary

REPORT OF COMMITTEE

B-9 ON METAL POWDERS AND METAL POWDER PRODUCTS

Committee B-9 on Metal Powders and Metal Powder Products held one meeting during the year: in Philadelphia, Pa., on Oct. 12, 1969. The Executive Committee held two meetings during the year and most subcommittees also met twice.

The committee consists of 82 voting members, of whom 24 are classified as powder producers, 19 as consumers of powder and producers of parts, 21 as consumers and 18 as general interest members.

At the October meeting, Robert A. Huseby was appointed to succeed Athan Stosuy as chairman of Subcommittee II-A.

The following officers were nominated and unanimously approved by letter ballot for terms commencing at the end of the ASTM 1970 Annual Meeting:

Chairman, A. C. Neeley.

First Vice-Chairman, L. F. Pease, III.

Second Vice-Chairman, A. J. Craig, Jr.

Secretary, R. R. Van Valkenburg.

Assistant Secretary, A. B. Backensto.

Executive Committee, F. V. Lenel, and J. R. Merhar.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee B-9 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which became effective on April 13, 1970.

New Standards:

B 525 - 70, Specification for Sintered Austenitic Stainless Steel Structural Parts (Subcommittee III B)

This specification covers P/M structural parts made of two stainless steel compositions similar to Type 304 (Grade I) and Type 316 (Grade II).

B 526 - 70, Method of Test for Coefficient of Friction and Wear of Sintered Metals Friction Materials Under Dry Clutch Conditions (Subcommittee III D)

This method covers determination of the static and dynamic coefficients of friction and the wear rate of sintered metal friction materials under dry clutch conditions by subjecting an annular test specimen to repeated inertia stops under a single set of conditions.

B 527 - 70, Method of Test for Tap Density of Refractory Metals and Compounds by Tap-Pak Volumeter (Subcommittee II B)

This method covers determination of the tap density (packing density) of refractory metal powders and compounds by means of the Tap-Pak Volumeter.

B 528 - 70, Method of Test for Transverse Rupture Strength of Sintered Metal Powder Specimens (Subcommittee III)

This method covers determination of the transverse rupture strength of sintered metal powder test specimens by subjecting them to a uniformly increasing transverse loading under controlled conditions.

Revision of Standards:

B 222 - 70 (formerly B 222 - 68), Specification for Sintered Iron-Copper Structural Parts (Subcommittee III B)

The specification was revised to get a uniform format including a uniform 0.3-g/cm³ density variation and constant 30 days rejection period.

B 243 - 70 (formerly B 243 - 68a), Definitions of Terms Relating to Powder Metallurgy (Subcommittee I)

These definitions were revised to bring the

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term Premix into common usage in the industry.

B 255 - 70 (formerly B 255 - 68), Specification for Bronze Sintered Metal Powder Structural Parts (Subcommittee III B)

This was revised to get a uniform format including a uniform 0.3-g/cm^3 density variation and a constant 30 days rejection period.

B 282 - 70 (formerly B 282 - 60), Specification for Brass Sintered Metal Powder Structural Parts (Subcommittee III B)

The revision was to get a uniform format including a uniform 0.3-g/cm^3 density variation and a constant 30 days rejection period.

B 303 - 70 (formerly B 303 - 67), Specification for Copper-Infiltrated Sintered Carbon Steel Structural Parts (Subcommittee III B)

This was revised to get a uniform format including a uniform 0.3-g/cm^3 density variation and a constant 30 days rejection period.

B 310 - 70 (formerly B 310 - 67), Specification for Sintered Carbon Steel Structural Parts (Subcommittee III B)

The revision was to get a uniform format including a uniform 0.3-g/cm^3 density variation and a constant 30 days rejection period.

B 329 - 70 (formerly B 329 - 61), Method of Test for Apparent Density of Refractory Metals and Compounds by the Scott Volumeter (Subcommittee II)

The method was revised to make it clearer and to cover the many instances in which the powder does not flow and must be brushed through the sieve.

B 406 - 70 (formerly B 406 - 64), Recommended Practice for Determination of Transverse Rupture Strength of Cemented Carbides (Subcommittee III C)

The revision was to bring the standard into agreement with the Cemented Carbide Producers Association method of reporting results.

B 426 - 70 (formerly B 426 - 68), Specification for Sintered Copper Steel Structural Parts (Subcommittee III B)

This was revised to get a uniform format including a uniform 0.3-g/cm^3 density variation and a constant 30 days rejection period.

B 438 - 70 (formerly B 438 - 67), Specification for Copper-Base Sintered Metal Powder Bearings (Oil Impregnated) (Subcommittee III A)

The revision was to simplify and bring the appendix into conformance with current industry practice.

B 439 - 70 (formerly B 439 - 67), Specification for Iron-Base Sintered Metal Powder Bearings (Oil Impregnated) (Subcommittee III A)

This was revised to simplify and bring the appendix into conformance with current industry practice.

B 458 - 70 (formerly B 458 - 67), Specification for Nickel Silver Sintered Metal Powder Structural Parts (Subcommittee III B)

The revision was to get a uniform format including a uniform 0.3-g/cm^3 density variation and a constant 30 days rejection period.

B 484 - 70 (formerly B 484 - 68), Specification for Sintered Nickel Steel Structural Parts (Subcommittee III B)

The revision was to obtain a standard format.

Reapproval of Standards:

B 212 - 48 (1970), Method of Test for Apparent Density of Metal Powders

B 213 - 48 (1970), Method of Test for Flow Rate of Metal Powders

B 214 - 66 (1970), Method of Test for Sieve Analysis of Granular Metal Powders

B 215 - 60 (1970), Specification for Sampling Finished Lots of Metal Powders

B 293 - 60 (1970), Specification for Subsieve Analysis of Granular Metal Powders by Air Classification

B 294 - 64 (1970), Recommended Practice for Hardness Testing of Cemented Carbides

B 312 - 64 (1970), Method of Test for Green Strength of Compacted Metal Powder Specimens

B 330 - 65 (1970), Method of Test for Aver-

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- age Particle Size of Refractory Metals and Compounds by Fisher Subsieve Sizer
- B 331 - 64 (1970)**, Method of Test for Compressibility of Metal Powder
- B 347 - 64 (1970)**, Method of Test for Hardness of Sintered Metal Friction Materials
- B 376 - 65 (1970)**, Method of Test for Density of Sintered Metal Friction Materials
- B 378 - 65 (1970)**, Method of Test for Transverse Rupture Strength of Sintered Metal Friction Materials
- B 390 - 64 (1970)**, Recommended Practice for Evaluating Apparent Grain Size and Distribution of Cemented Tungsten Carbides
- B 417 - 64 (1970)**, Method of Test for Apparent Density of Non-Free Flowing Metal Powders
- B 421 - 67 (1970)**, Recommended Practice for the Determination of Electrical Resistivity of Cemented Tungsten Carbides
- B 430 - 67 (1970)**, Method of Test for Particle Distribution of Tungsten Metal Powder by Turbidimetry
- B 460 - 68 (1970)**, Method of Test for Dynamic Coefficient of Friction and Wear of Sintered Metal Friction Materials Under Dry Conditions
- B 461 - 67 (1970)**, Method of Test for Frictional Characteristics of Sintered Metal Friction Materials Run in Lubricants
- B 458 - 68 (1970)**, Specification for Diametral Compression Testing of Cemented Carbides

These new and revised standards appear in the 1970 *Annual Book of ASTM Standards*, Part 7.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee I on Nomenclature and Technical Data (Frank Emley, chairman) approved a change in E 23 - 66, Notched Bar Impact Testing of Metallic Materials, to include a procedure for sintered metal powder bars. This has been forwarded to Committee E-1 for review and adoption. The complete glossary is being reviewed to ensure uniformity of definitions within the industry and especially in comparison with the MPIF glossary.

Subcommittee II on Metal Powders (Athan Stosuy, Chairman):

Section A on Base Metal Powders

(Athan Stosuy, chairman) has been developing the concept of a standard classification system for iron powders. A round-robin test program is starting to evaluate the use of the Fisher Sub-Sieve Sizer on base metal powders. A task force has been appointed to evaluate a survey made of apparent density test methods and to recommend improved methods for apparent and "fill" density. A number of task forces reviewed all current standards under the subcommittee jurisdiction, resulting in the reapproval of these standards as indicated above.

Section B on Refractory Metal Powders (W. A. Buerkel, chairman) had task forces which conducted round-robin test programs on apparent density and tap density of refractory powders, resulting in the revision of Method B 329 and the writing of a new standard for tap density. A third task force conducted a round-robin test series on the compressive strength of pressed refractory metal powder compacts. The committee decided to abandon this work as it appeared to have no practical usefulness. A fourth task force is conducting a round robin test program on surface area measurements of refractory metal powders. The subcommittee maintained liaison with Committee E-3 on chemical analysis of refractory metal powders and with Committee C-22 on particle size analysis determination of sub-sieve size ceramic powders.

Subcommittee III on Metal Powder Products (H. R. Biehl, chairman):

Section A on Bearings (F. I. Zaleski, chairman) revised Methods B 438 and B 439 and voted to withdraw Method B 377, for Steel Backed Metal Powder Bearing and Bushing Alloys, due to a lack of interest in this standard. Extensive changes are being made in Method B 328, Density and Interconnected Porosity of Sintered Powder Metal Structural Parts and Oil Impregnated Bearings, a joint standard with Section III-B.

Section B on Structural Parts (N. A. Arnold, chairman) appointed a task force under A. J. Craig, Jr., to review and compare all the material specifications under committee jurisdiction to ensure that the general format was consistent in approach. The rewritten specifications have been approved by ASTM under the interim procedure.

Section C on Cemented Carbides (C. R.

REPORT OF COMMITTEE B-9

Brunswic, chairman) reviewed and made editorial changes in Recommended Practices B 294, B 390, and B 421, as well as major changes in B 406, Determination of Transverse Rupture Strength of Cemented Carbides. Present activities include the establishment of standards for surface preparation, compressive strength and abrasive wear resistance of cemented carbides.

Section D on Friction Metals (H. B. Huntress, chairman) reviewed all its current procedures and included metric equivalents. The committee has drawn up two new procedures for friction dynamometer tests, one for high-energy dry tests such as would apply to aircraft brakes, and one for low-energy dry tests such as would be used for clutches. No further standards are contemplated at present.

Section E on Machineable Heavy Tools (J. F. Kuzmick, chairman) did not meet during the year.

Subcommittee IV, U.S.A. Committee for ISO/TC 119 on Testing of Powder Metallurgy Materials and Powders (Athan Stosuy, chairman) is in the introductory stages of examining proposals made by all four of the international groups. The committee will be host at a meeting of ISO/TC 119 to be held in conjunction with the International Powder Conference in New York City, July 1970.

Respectfully submitted on behalf of the committee,

GEORGE OTTO,
Chairman.

J. B. HAERTLEIN,
Secretary.

REPORT OF COMMITTEE B-10 ON REACTIVE AND REFRACTORY METALS AND THEIR ALLOYS

Committee B-10 on Reactive and Refractory Metals and their Alloys held three meetings in 1969: on Feb. 5, 1969, in Denver, Colo., on June 27, 1969, in Atlantic City, N. J., and on Dec. 4, 1969, in Pittsburgh, Pa.

Subcommittees of Committee B-10 held meetings during 1969 as follows: Subcommittee I on Titanium—on Feb. 4, 1969, in Denver, Colo., on June 27, 1969, in Atlantic City, N. J., and on Dec. 4, 1969, in Pittsburgh, Pa.; Subcommittee II on Zirconium and Hafnium—on Feb. 4, 1969, in Denver, Colo., on June 26, 1969, in Atlantic City, N. J., and on Dec. 4, 1969, in Pittsburgh, Pa.; Subcommittee III on Columbium and Tantalum—on Feb. 5, 1969, in Denver, Colo. and on Oct. 19, 1969, in Philadelphia, Pa.; and Subcommittee IV on Molybdenum and Tungsten—on Feb. 5, 1969, in Denver, Colo. and on Oct. 19, 1969, in Philadelphia, Pa.

The voting membership of Committee B-10 consists of 48 producers, 15 consumers, and 29 general-interest members.

During 1969, Larry C. Shaheen was appointed chairman of Subcommittee III, replacing Richard W. Douglass who resigned. No other administrative changes occurred during the year.

No symposia were sponsored by Committee B-10 during 1969. However, plans have been initiated to sponsor a symposium on Fabrication of Titanium for the Chemical Process Industry at Williamsburg, Va., in November 1970 and a symposium on Zirconium Test Methods in November 1970.

The following officers were elected for the ensuing two-year term:

Chairman, E. W. Kleefisch
Vice-Chairman, John Huber
Secretary, Fred Kubli, Jr.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1968 annual report, Committee B-10 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which became effective on the dates indicated:

New Standard Specifications for:

B 493 - 69, Zirconium Forgings and Extrusions for Nonnuclear Application (Subcommittee II) (effective May 9, 1969)

This specification covers unalloyed zirconium forgings and extrusions for non-nuclear applications, excluding tubing.

B 494 - 69, Primary Zirconium for Nonnuclear Applications (Subcommittee II) (effective May 9, 1969)

This specification covers primary zirconium metal commonly designated as sponge or chunklets, but may also take other forms. Four alloys, all for nonnuclear applications, are included. This specification does not include crystal bar zirconium.

B 495 - 69, Zirconium Ingots for Nonnuclear Application (Subcommittee II) (effective May 9, 1969)

This specification covers vacuum arc melted zirconium ingots for nonnuclear application.

B 521 - 70, Tantalum and Tantalum Alloy Tubing (Subcommittee III) (effective May 19, 1970)

This specification covers tantalum and tantalum alloy tubing of the following types:

REPORT OF COMMITTEE B-10

Alloy 400—unalloyed tantalum, Alloy 401—tantalum 10 percent tungsten.

B 523 - 70, Seamless and Welded Zirconium Tubes for Nonnuclear Application

This specification covers unalloyed zirconium tubes for nonnuclear application. Both seamless and welded tubing are included.

Adoption of Tentatives as Standards Without Revisions:

B 364 - 70 (formerly B 364 - 62 T), Specification for Tantalum Ingots and Flat Mill Products (Subcommittee III) (effective Jan. 22, 1970)

B 365 - 70 (formerly B 365 - 62 T), Specification for Tantalum Rod and Wire (Subcommittee III) (effective Jan. 22, 1970)

B 384 - 69 (formerly B 384 - 64 T), Specification for Molybdenum and Molybdenum Alloy Forgings (Subcommittee IV) (effective Dec. 19, 1969)

B 385 - 69 (formerly B 385 - 64 T), Specification for Molybdenum and Molybdenum Alloy Billets for Reforging (Subcommittee IV) (effective Dec. 19, 1969)

B 386 - 69 (formerly B 386 - 62 T), Specification for Molybdenum and Molybdenum Alloy Strip, Sheet, Foil and Plate (Subcommittee IV) (effective Dec. 19, 1969)

B 387 - 69 (formerly B 387 - 64 T), Specification for Molybdenum and Molybdenum Alloy Bar, Rod, and Wire (Subcommittee IV) (effective Dec. 19, 1969)

B 394 - 70 (formerly B 394 - 62 T), Specification for Columbium, Columbium Alloy Seamless and Welded Tubes (Subcommittee III) (effective Jan. 22, 1970)

Adoption of Tentatives as Standards with Revision:

B 265 - 69 (formerly B 265 - 58 T), Specification for Titanium and Titanium Alloy Strip, Sheet, and Plate (Subcommittee I) (effective Feb. 20, 1969)

B 348 - 69 (formerly B 348 - 59 T), Specification for Titanium and Titanium Alloy Bars and Billets (Subcommittee I) (effective Feb. 20, 1969)

B 353 - 69 (formerly B 353 - 64 T), Specification for Wrought Zirconium and Zirconium Alloy Seamless and Welded Tubes for Nuclear Service (Subcommittee II) (effective Oct. 17, 1969)

B 367 - 69 (formerly B 367 - 61 T), Specification for Titanium and Titanium Alloy Castings (Subcommittee I) (effective Oct. 17, 1969)

B 381 - 69 (formerly B 381 - 61 T), Specification for Titanium and Titanium Alloy Forgings (Subcommittee I) (effective Feb. 20, 1969)

These five specifications were revised to conform to present practices.

Revision of Standard:

B 299 - 69 (formerly B 299 - 64), Specification for Titanium Sponge (Subcommittee I) (effective Sept. 19, 1969)

This specification was revised to include sodium reduced sponge and to satisfy the needs of industry.

AMERICAN NATIONAL STANDARDS

The following standards have been approved during the year as American National Standards by the American National Standards Institute:

B 265 - 69; ANSI Z179.1-1970, Specification for Titanium and Titanium Alloy Strip, Sheet, and Plate

B 348 - 69; ANSI Z179.2-1970, Specification for Titanium and Titanium Alloy Bars and Billets

B 381 - 69; ANSI Z179.3-1970, Specification for Titanium and Titanium Alloy Forgings

B 384 - 69; ANSI Z179.4-1970, Specification for Molybdenum and Molybdenum Alloy Forgings

B 385 - 69; ANSI Z179.5-1970, Specification for Molybdenum and Molybdenum Alloy Billets for Reforging

B 386 - 69; ANSI Z179.6-1970, Specification for Molybdenum and Molybdenum Alloy Strip, Sheet, Foil and Plate

B 387 - 69; ANSI Z179.7-1970, Specification for Molybdenum and Molybdenum Alloy Bar, Rod and Wire

B 493 - 69; ANSI Z179.8-1970, Specification for Zirconium Forgings and Extrusions for Nonnuclear Application

B 494 - 69; ANSI Z179.9-1970, Specification for Primary Zirconium for Nonnuclear Application

B 495 - 69; ANSI Z179.10-1970, Specifica-

REPORT OF COMMITTEE B-10

tation for Zirconium Ingots for Nonnuclear Application

The following standards have been submitted to American National Standards Institute for approval: B 299 - 69, B 353 - 69, B 364 - 70, B 365 - 70, B 394 - 70, and B 523 - 70.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee I on Titanium (Robert Kane, chairman)—In addition to the specifications on titanium and titanium alloys listed above, an addendum to Specification B 265 is being prepared and task groups are working on specifications for welded and seamless titanium tubing, titanium alloys for desalinization equipment, and a review of existing titanium specifications to determine the advisability of adding new alloy compositions to existing specifications.

This subcommittee has initiated plans to hold a titanium symposium in conjunction with the Committee Week scheduled for November 1970 in Williamsburg, Va.

Subcommittee II on Zirconium and Hafnium (E. F. Baroch, chairman)—In addition to the specifications on zirconium and zirconium alloys listed above, preparation of specifications on nonnuclear flat and round zirconium alloys and zirconium castings are in preparation. A special task on ultrasonic inspection of zirconium tubing is in progress. The results of this round robin will be reported at the next committee meeting in June 1970. A separate task group on hydride orientation in zirconium tubing is completing

its work with a final report on the results also scheduled for the June 1970 committee meeting. A zirconium symposium on test methods is being planned for November 1970.

Subcommittee III on Columbium and Tantalum (L. C. Shaheen chairman)—Three tentative specifications (B 364, B 365, and B 394) were adopted as standards in 1969. In addition, a specification on tantalum and tantalum alloy tubing was approved by Committee B-10 and submitted to ASTM for approval. Subcommittee III also cooperated with Committee E-20, Subcommittee IV, in the preparation of a tantalum thermocouple tubing specification.

Because of the low level of commercial activity in columbium and tantalum alloys at this time, Subcommittee III will meet only once a year until more interest is evident.

Subcommittee IV on Tungsten and Molybdenum (L. P. Clare chairman) has completed its review of existing specifications on molybdenum and tungsten and recommended that all tentative specifications be advanced to standards. Because of the reduction in activity in the materials covered by this subcommittee, it will meet only once a year until such time as interest is renewed.

Respectfully submitted on behalf of the committee,

H. R. OGDEN,
Chairman.

FRED KUBLI, JR.,
Secretary.

REPORT OF COMMITTEE C-1 ON CEMENT

Committee C-1 on Cement and its subcommittees held two meetings during the year: on June 25 to 27, 1969, in Atlantic City, N. J., and on Dec. 1 and 2, 1969, in Williamsburg, Va.

The committee consists of 162 active members who command 112 votes; of which 39 are classified as producer, 36 as consumer, and 37 as general interest votes. There are 16 honorary members, each of whom commands a vote.

In recognition of their long association with Committee C-1, and their many contributions to its work, J. B. Alexander, R. L. Blaine, A. J. Blank, and H. L. Vanderwerp were made honorary members.

H. H. Newlon and W. S. Weaver received the Award of Merit at the June 1970 Annual Meeting in Toronto.

The committee records with sorrow the deaths of honorary members R. L. Blaine, who joined in 1943, R. E. Davis, who joined in 1934, and M. A. Swayze, who joined in 1932; and of Alexander Klein, who joined in 1960.

The officers elected for the ensuing term of two years are as follows:

Chairman, Bryant Mather.

Vice-Chairman, W. J. McCoy.

Secretary, J. L. Gilliland.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee C-1 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which were accepted by the Society effective on the dates indicated:

Adoption of Tentatives as Standards Without Revision:

Methods of Test for:

C 563 - 70 (formerly C 563 - 66 T), Optimum SO₃ in Portland Cement (Subcommittee on Sulfate Content) (effective April 13, 1970)

C 596 - 70 (formerly C 596 - 67 T), Measuring the Drying Shrinkage of Mortar Containing Portland Cement (Subcommittee on Volume Change) (effective Aug. 14, 1970)

Adoption of Tentative as Standard with Editorial Revision:

C 465 - 70 (formerly C 465 - 66 T), Specification for Processing Additions for Use in the Manufacture of Portland Cement (Subcommittee on Additions) (effective April 13, 1970)

A number of important editorial changes were made.

Revision of Standards:

C 10 - 70 (formerly C 10 - 64), Specification for Natural Cement (Subcommittee on Masonry Cement) (effective April 13, 1970)

The format of this specification was changed, and several of the requirements for natural cement were revised.

C 10 - 70a (formerly C 10 - 70), Specification for Natural Cement (Subcommittee on Masonry Cement) (effective Aug. 14, 1970)

A new definition for natural cement was adopted.

C 91 - 69 (formerly C 91 - 68), Specification for Masonry Cement (Subcommittee on Masonry Cement) (effective Nov. 7, 1969)

REPORT OF COMMITTEE C-1

The limit on the air content of masonry mortars prepared and tested in accordance with this specification was reduced from 24 to 22 percent.

C 91-70 (formerly C 91-69), Specification for Masonry Cement (Subcommittee on Masonry Cement) (effective Aug. 14, 1970).

The permissible residue on the No. 325 mesh screen was raised from 15 to 24 percent to provide a value equivalent to that which would be obtained on a precision micromesh sieve.

C 115-70 (formerly C 115-67), Method of Test for Fineness of Portland Cement by the Turbidimeter (Subcommittee on Fineness) (effective Aug. 14, 1970).

The procedure for determining the fineness of cements was changed to compensate for apparent differences in fineness values occurring when sieve correction factors are based on precision micromesh sieves rather than on bronze sieves.

C 150-69a (formerly C 150-69), Specification for Portland Cement (Subcommittee on Portland Cement) (effective Oct. 17, 1969).

C 175-69 (formerly C-175-68), Specifications for Air-Entraining Portland Cement (Subcommittee on Portland Cement) (effective Oct. 17, 1969).

The limit on the SO_3 content of Types I, IA, II, IIA, III, and IIIA portland cement was increased by 0.5 percent.

C 150-70 (formerly C 150-69a), Specification for Portland Cement (Subcommittee on Portland Cement) (effective Oct. 2, 1970).

Specification C 150 and C 175 were combined with some changes in requirements.

C 185-70 (formerly C 185-59), Method of Test for Air Content of Hydraulic Cement Mortar (Subcommittee on Air-Entrainment) (effective April 13, 1970).

Note 3 changed to stipulate that freshly washed standard sand shall be used in the event of uncertainty about the amount of air

entrained in mortars prepared and tested in accordance with the method.

C 190-70 (formerly C 190-63), Method of Test for Tensile Strength of Hydraulic Cement Mortars (Subcommittee on Strength) (effective April 13, 1970).

The test was converted from a performance test to a research test.

C 191-70 (formerly C 191-65), Method of Test for Time of Setting of Hydraulic Cement by Vicat Needle (Subcommittee on Time of Set) (effective Aug. 14, 1970).

The test was revised to provide for determination of a final setting time in addition to an initial setting time.

C 430-70 (formerly C 430-68), Method of Test for Fineness of Hydraulic Cement by the No. 325 Sieve (Subcommittee on Fineness) (effective Aug. 14, 1970).

The procedure for calculating correction factors for No. 325 sieves was changed to illustrate use of precision micromesh sieve values as a reference.

C 490-70 (formerly C 490-69), Specification for Apparatus for Use in Measurement of Length Change of Hardened Cement Paste, Mortar, and Concrete (Subcommittee on Coordination of Methods) (effective Aug. 14, 1970).

New requirements for laboratory weights were adopted.

Withdrawal of Standard:

C 175-69, Specification for Air-Entraining Portland Cement (Subcommittee on Portland Cement) (effective Oct. 2, 1970).

This specification has been combined with Specification C 150.

The revised standards will appear in the 1970 *Annual Book of ASTM Standards*, Part 9.

AMERICAN NATIONAL STANDARDS

The following standards have been approved during the year as American National Standards by the American National Standards Institute:

C 91-69, ANSI A1.3-1970, Specification for Masonry Cement.

REPORT OF COMMITTEE C-1

C 114 - 69, ANSI A1.5-1970, Chemical Analysis of Hydraulic Cement

C 150 - 69a, ANSI A1.1-1970, Specification for Portland Cement

C 175 - 69, ANSI A1.16-1970, Specifications for Air-Entraining Portland Cement

C 183 - 68a, ANSI A1.2-1970, Method of Sampling Hydraulic Cement.

C 204 - 68, ANSI A1.19-1970, Method of Test for Fineness of Portland Cement by Air Permeability Apparatus

C 226 - 68, ANSI A1.24-1970, Specification for Air-Entraining Additions for Use in the Manufacture of Air-Entraining Portland Cement

C 490 - 69, ANSI A1.33-1970, Specification for Apparatus for Use in Measurement of Length Change of Hardened Cement Paste, Mortar, and Concrete.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee on Cement and Concrete Reference Laboratory (J. H. Walker, chairman) is supervising the work of the Cement and Concrete Reference Laboratory on behalf of Committees C-1 and C-9.

Subcommittee on Portland Cement (J. L. Gilliland, chairman) has combined ASTM Specification C 150, for Portland Cement, and Specification C 175, for Air-Entraining Portland Cement. They are studying proposed revisions of the strength limits for portland cements, and reviewing questions of current interest concerning chemical requirements for Types II, IIA, IV, and V portland cements.

Subcommittee on Masonry Cement (E. J. Wechter, chairman) is studying the possible need for a second type of masonry cement.

Subcommittee on Blended Cement (R. H. Brink, chairman) is planning a cooperative test series to provide a basis for establishing specification limits on expansion, strength, and setting time for the shrinkage-compensating type of expansive cement.

Subcommittee on Additions (C. U. Pierson, chairman) is preparing to recommend adoption of a specification for functional additions.

Subcommittee on Air-Entrainment (W. L. Dolch, chairman) is making plans for the establishment of a better precision statement for Method C 185, Test for Air Content of Hydraulic Cement Mortar.

Subcommittee on Workability (F. J. Mar-dulier, chairman) is concluding a series of tests in which ten laboratories participated to determine if Method C 187, Test for Normal Consistency of Hydraulic Cement, should be revised to provide for release of the Vicat plunger at the earliest possible moment in order to offset, in so far as possible, the effect of false set on normal consistency values.

Subcommittee on Chemical Analysis (W. G. Hime, chairman) is writing procedures and developing data for rapid wet-spectrophotometric methods, an atomic absorption procedure, and an X-ray fluorescence procedure.

Subcommittee on False Set (O. E. Jack, chairman) has completed a series of tests on 23 cements in which eight laboratories participated. The tests were made to compare the results obtained by a modified mixing procedure for Method C 451, Test for False Set of Portland Cement (Paste Method), with results obtained by Method C 359, Test for False Set of Portland Cement (Mortar Method). If the data show improved correlation between the two test methods, a revision of Method C 451 will be presented.

Subcommittee on Fineness (K. J. Schatz-lein, chairman) is studying problems related to determining the fineness of hydraulic cements by means of the No. 325 sieve and the Wagner turbidimeter, and is working toward the development of new or improved precision statements for the methods of test under its jurisdiction.

Subcommittee on Heat of Hydration (W. J. McCoy, chairman) is planning a cooperative test program to determine if the heat of hydration of portland-pozzolan cements can be satisfactorily determined by Method C 186, Test for Heat of Hydration of Hydraulic Cement, or a modification of it, and conducting a study to determine the adequacy of the chemical limits in Specification C 150, for Portland Cement, with regard to heat of hydration requirements.

Subcommittee on Strength (O. E. Brown, chairman) is considering the need for revisions of Method C 109, Test for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. Cube Specimens), to improve the uniformity of the test, is reviewing the compressive strength requirements for

REPORT OF COMMITTEE C-1

portland cement, and is continuing to look for a new method for measuring the tensile strength.

Subcommittee on Sulfate Content (K. E. Palmer, chairman) has completed all scheduled assignments, and is developing plans for future activities.

Subcommittee on Sulfate Resistance (R. P. Vellines, chairman) is considering recommending a change in the chemical limits for Type V portland cement.

Subcommittee on Time of Set (J. S. Offutt, chairman) is studying suggestions for revision of the Vicat time of setting test.

Subcommittee on Volume Change (L. E. Halsted, chairman) is conducting a series of tests using 500 g and 650 g of cement to determine if a change in batch size would have an effect on the results obtained in time of setting and autoclave soundness tests.

Subcommittee on ASTM and Federal Specifications (J. L. Gilliland, chairman) is keeping Committee C-1 informed of changes in Federal specifications and methods of test for cementitious materials as part of a continuing effort to minimize differences between ASTM and Federal requirements.

Editorial Subcommittee (W. E. Parker, chairman) is reviewing changes in the specifications and methods of test under the jurisdiction of Committee C-1 for the purposes of improving the texts and promoting compliance with Society editorial practices.

Subcommittee on International Standards (B. E. Foster, chairman) is following the work of the Pan American Standards Com-

mittee on Cement and ISO/TC 74 on Hydraulic Binders on behalf of the United States.

Subcommittee on Coordination of Methods of Test (J. R. Dise, chairman) is collecting information about variations in standard test sands for possible use in the development of new specifications for the sands.

Subcommittee on Papers and Symposia (J. L. Goetz, chairman) has arranged for publication of papers on the Significance of Tests for Fineness presented during a meeting of Committee C-1 in San Francisco in 1968, and has arranged a Cement Symposium for the 1970 Annual Meeting of the Society in Toronto.

Subcommittee on Statistical Methods (Paul Seligmann, chairman) is assisting the Subcommittees on Fineness and Chemical Analysis with the formulation of precision statements for methods under their jurisdictions, and is planning to develop a guide to methods of data analysis for subcommittee chairmen. A special undertaking in which representatives of Committees C-1, C-9, D-4, and D-18 cooperated to prepare instructions to guide the subcommittees of the four committees in the writing of precision statements has been completed.

Respectfully submitted on behalf of the committee,

BRYANT MATHER,
Chairman

J. L. GILLILAND,
Secretary

REPORT OF COMMITTEE

C-3 ON CHEMICAL-RESISTANT NONMETALLIC MATERIALS

Committee C-3 on Chemical-Resistant Nonmetallic Materials held two regular meetings during the year: on Sept. 17, 18, and 19, 1969, in St. Louis, Mo., and on March 25, 26, and 27, 1970, in Atlanta, Ga. The committee consists of 27 voting members of whom 17 are classified as producers, 9 as consumers, and 11 as general interest members.

The following committee officers were elected for the term 1970 to 1972:

Chairman, C. V. Wittenwyler
Vice-Chairman, G. P. Gabriel
Membership Secretary, R. R. McClain
Executive Committee, P. F. Sauereisen, E. A. Reineck, and W. H. Burton

RECOMMENDATIONS ACCEPTED BY THE COMMITTEE ON STANDARDS

Subsequent to the 1969 annual report, Committee C-3 presented to the Society through the Committee on Standards the following recommendation, which was accepted effective on June 12, 1970:

New Tentative Specification for:

C 658 - 70 T, Resin Chemical-Resistant Grouts (Subcommittee S-1)

This specification covers the requirements for resin chemical-resistant grouts for filling joints of chemical-resistant tile or brick floors.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee C-3 submitted the following recommendation to the Society for action under the Interim Procedure for Standards, which was accepted effective on June 15, 1970:

Reapproval of Standard with Editorial Change:

C 386 - 60 (1970), Recommended Practice for Use of Chemical-Resistant Sulfur Mortars (Subcommittee S-1)

ACTIVITIES OF SUBCOMMITTEES

Subcommittee S-1 on Chemical-Resistant Mortars (J. M. Walters, chairman) submitted revisions to Specifications C 395, Chemical-Resistant Resin Mortars, and Specification C 466, Chemically Setting Silicate and Silica Chemical-Resistant Mortars, for letter ballot. Further revision to Recommended Practice C 386, Use of Chemical-Resistant Sulfur Mortars, are being considered.

Subcommittee S-4 on Monolithic Surfacing (R. G. Bellamy, chairman)—A tentative Specification for Monolithic Surfacing is in the final stages of preparation. Methods of test for impact, thermal shock, surface preparation, and abrasion are being worked on.

Subcommittee S-5 on Plastic Systems (W. A. Severance, chairman) is working on a tentative Specification for Fiberglass Reinforced Plastic, (FRP) Pipe and Ducts which should be ready for submission to ballot soon. New work has been started on a specification for FRP tanks.

Subcommittee T-1 on Mechanical Properties (F. G. Kerr, chairman)—Round-robin tests on impact and bond strength are in progress. Tests on abrasion and elongation are still being written.

Subcommittee T-2 on Physical Properties (W. R. Slama, chairman) is considering a method of test for density of mortars and surfacings. Changes in Method C 308, Tests for Working and Setting Times of Chemically Resistant Resin Mortars, and Method C 414, Tests for Working and Setting Times

REPORT OF COMMITTEE C-3

of Chemical-Resistant Silicate and Silica Mortars, are being submitted for ballot.

Subcommittee T-3 on Chemical Properties (K. A. Heffner, chairman)—Round-robin tests on a Dry Heat Limits Method are still inconclusive. Additional tests are scheduled. Changes in Method C 267, Tests for Chemical-Resistant Mortars, are being submitted for letter ballot. Method C 619, Tests for Chemical Resistance of Asbestos Fiber Reinforced Thermosetting Resins Used in Self-Supporting Structures, is to be balloted for approval as standard.

Subcommittee T-4 on Recommended Practices (W. H. Burton, acting chairman)—

A new Recommended Practice C 658, for Resin Chemical-Resistant Grouts, has been adopted. A joint meeting with Subcommittee S-5 produced agreement on handling of specifications on FRP tanks, pipe, and ducts.

Respectfully submitted on behalf of the committee,

C. V. WITTENWYLER,
Chairman

D. J. KOSSLER,
Secretary

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REPORT OF COMMITTEE C-4 ON CLAY PIPE

Committee C-4 on Clay Pipe and its Subcommittee II held one meeting during the year: on June 23 and 24, 1969, at Atlantic City, N. J.

The committee consists of 49 voting members, of whom 22 are classified as producers, 19 as consumers, and 9 as general interest members.

In accordance with Society regulations, Committee C-4 by letter ballot taken prior to the 1970 Annual Meeting, elected the following officers to a two year term:

Chairman, R. H. Welles.

Vice-Chairman, S. W. Jens.

Secretary, E. M. Masterson.

Assistant Secretary, G. S. Magnuson.

At the Annual Meeting on June 24, Committee C-4 voted unanimously to amend its bylaws as follows:

Article II—Add "and couplings" after "compression joints."

Article IV—Add "and assistant secretary" in the first and third sentences of Section 1. In Section 2 add the same in sentence 4 and the same for the first sentence of Section 4. In the second sentence of Section 4, change "He" to "The secretary."

Article V—In Section 7, add "and assistant secretary" in the first sentence.

Article VI—In Section 1, add "and assistant secretary" in the first sentence.

Subcommittee C-4.1 (formerly Nomenclature) was reorganized and a permanent committee was formed to establish editorial and technical consistency of all standards and tentatives under the jurisdiction of Committee C-4. This committee has the duty of reorganizing and regrouping current specifications to ensure suitable coordination among all standards.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee C-4 submitted the following recommendation to the Society for action under the Interim Procedure for Standards which was accepted by the Society effective April 13, 1970.

Adoption of Tentative as Standard with Revision:

Specification for:

C 594 - 70 (formerly C 594 - 66 T), Compression Couplings for Vitrified Clay Plain-End Pipe (Subcommittee C-4.2)

This specification was revised in accordance with the Society's rule for three-year tentatives.

The revised standard will appear in the 1971 *Annual Book of ASTM Standards*, Part 12, but is available as a separate reprint.

AMERICAN NATIONAL STANDARDS

The following standards have been approved during the year as American National Standards by the American National Standards Institute:

C 211 - 68, ANSI A106.1-1969, Specifications for Standard and Extra Strength Perforated Clay Pipe.

C 301 - 68, ANSI A106.5-1969, Method of Testing Clay Pipe.

This report has been submitted to all members of the committee.

Respectfully submitted on behalf of the committee,

R. H. WELLES,
Chairman

E. M. MASTERSON,
Secretary

REPORT OF COMMITTEE

C-5 ON MANUFACTURED CARBON AND GRAPHITE PRODUCTS

Committee C-5 on Manufactured Carbon and Graphite Products held one meeting during the year, on June 25, 1970, in Toronto, Ontario, Canada. Subcommittees III and IV met on Nov. 19 to 20, 1969, in Philadelphia, Pa., and Subcommittee V met on Oct. 21 to 22, 1969, in Gatlinburg, Tenn. There were no meetings of Subcommittees I, II, VI, and VII.

Membership of C-5 consists of 60 organizations grouped as follows: 14 producers, 34 consumers, and 12 general interest. There were 115 individuals on the committee mailing list reissued in April, 1970.

This marks the fifth year of activity for Committee C-5. During its first five years, the committee has developed and gained acceptance of eleven test methods and one recommended practice.

On Sept. 17, 1969, J. H. Bystrom was appointed as the committee's Headquarter Staff Liaison, replacing J. A. Dwyer.

Murray Slone, committee chairman, changed his address to Lockheed Propulsion Co., Redlands, Calif. 92374, in November 1969.

E. L. Woodruff, chairman of Subcommittee V, resigned in March 1970. W. J. Gray replaces him as Battelle N/W representative on this subcommittee, and A. E. Goldman (Union Carbide Corp.) steps in as acting chairman of the subcommittee.

RECOMMENDATIONS ACCEPTED BY THE COMMITTEE ON STANDARDS

Subsequent to the 1969 annual report, Committee C-5 presented to the Society through the Committee on Standards the following recommendation which was accepted effective on April 27, 1970:

Tentative Approved for One-Year Extension:

C 565 - 65 T, Tentative Methods of Ten-

sion Testing of Carbon-Graphite Mechanical Materials (Subcommittee IV)

The tentative appears in the 1970 *Annual Book of ASTM Standards*, Part 13.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee C-5 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which were accepted by the Society effective on April 2, 1970:

New Standard:

C 651 - 70, Method of Test for Flexural Strength of Manufactured Carbon and Graphite Articles Using Four-Point Loading at Room Temperature (Subcommittee III)

This test method describes the procedure to be used in determining the flexural strength of manufactured carbon and graphite articles using a simple beam in four-point loading at room temperature.

The new standard will appear in the 1971 *Annual Book of ASTM Standards*, Part 13.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee I, Executive Subcommittee (M. C. Slone, chairman)—No meetings were held this year.

Subcommittee II on Nomenclature (G. W. Morelli, chairman)—A special grouping of standards dealing with manufactured graphite products was published in August 1969. More than 350 copies were sold in the first two months.

A list of special definitions peculiar to the carbon and graphite industry is being prepared by the chairman. It will be circulated to committee members for comments.

REPORT OF COMMITTEE C-5

Subcommittee III on Property Measurements (Chemical, Physical and Sampling) (W. J. Spry, chairman) is currently investigating methods for measuring hardness, permeability, tensile strength, and coefficient of thermal expansion.

Hardness—Hardness of manufactured carbon and graphite is now measured by several methods. Most producers use the Scleroscope, an instrument which measures the rebound height of a small pellet. Some consumers prefer penetration test methods such as the Rockwell. Task Force No. 1 chaired by Art Wendt (U. S. Graphite) is conducting a round robin to compare values by the several methods on a half-dozen grades of carbon and graphite. A single test method for hardness is desired by all parties.

Permeability—There is no generally accepted method for measuring or reporting the permeability of manufactured carbon and graphite. Since Subcommittee V has recently developed a method for nuclear graphite, Task Force No. 1 has tabled action until Committee C-5 members have had a chance to examine this method.

Tensile Strength—The tension test method developed by Subcommittee III, C 565 - 65 T, has the disadvantage of not being usable on coarse grain graphites such as electrode stock. Furthermore, it is not suitable for obtaining quantitative stress-strain curves or modulus values. Task Force No. 2, under Coultas Pears (Southern Research Institute) is developing a more widely applicable tension test method.

Coefficient of Thermal Expansion—There is no generally accepted way of measuring, or reporting CTE values for manufactured carbon and graphite. This property is temperature sensitive and depends upon the prior thermal history of the specimen. Task Force No. 3, chaired by Neils Oleson (Airco Speer), is conducting a round robin involving existing methods to see how values from different laboratories compare. This is the first step in arriving at a standard method for measuring this property.

Subcommittee III is turning its attention to the problems of the steel industry, graphite electrodes being a matter of concern for both producer and consumer. Sampling and non-destructive test methods top the list of projects to be investigated.

Subcommittee IV on Mechanical Graphite (John Abar, chairman) is active in developing test methods for those properties of prime concern in the design of mechanical components. Present interests are on tensile strength, modulus of elasticity, and Poisson's ratio.

Tension Test—Tightened tolerances were placed on the grips used for Method C 565 - 65 T to improve their axial alignment. The revised method was then submitted to Committee C-5 members for ballot vote with the following results: 33 affirmative, 1 negative, and 4 abstentions. Subcommittee IV members will review the comments and recommend appropriate action.

Modulus of Elasticity—A recently completed round robin disclosed that sonic test methods gave values averaging 5 percent higher than tensile stress-strain methods. Task Force No. 1, chaired by W. R. Shobert (Pure Carbon Co.), has decided to prepare three test methods, sonic velocity, sonic resonance, and tensile stress-strain.

Poisson's Ratio—A study of the need for data on this project has started.

Subcommittee V on Nuclear Graphite (A. E. Goldman, acting chairman)—Work was completed on three proposed test methods and they were submitted to the committee for a vote. Method C 625 - 68 T has been submitted to the Society for a vote, and the other two methods are being reviewed by the subcommittee, due to negative votes.

The subcommittee voted to table work on measuring surface roughness.

A tentative method for measuring thermal diffusivity has been prepared and is being circulated to interested parties.

Subcommittee work has started on location of flaws by X ray and a method for determination of pore spectra in graphite.

Subcommittee VI on Impregnated Graphite Pipe (W. J. Spry, acting chairman)—Errors in the proposed pipe standards have been eliminated, and all objections from the 1968 committee vote resolved. This standard was submitted to the Society for vote on April 28, 1970.

Membership and interest in the activities of this subcommittee have declined to the point that its chairman recommends its dissolution.

Subcommittee VII on Carbon Filaments,

REPORT OF COMMITTEE C-5

Fibers, Fabrics, and Fibrous Composites (Henry Brown, chairman)—No meetings of this subcommittee were held this year. The chairman prepared and circulated to subcommittee members a list of existing ASTM test methods recommended for testing this group of products.

Respectfully submitted on behalf of the committee,

M. C. SLONE,
Chairman

R. R. PAXTON,
Secretary

REPORT OF COMMITTEE C-6 ON PYROLYTIC MATERIALS

Committee C-6 on Pyrolytic Materials held a special meeting on June 23, 1970, during the 1970 ASTM Annual Meeting, in Toronto, Ontario, Canada.

The committee has been unable to obtain sufficient support to function as an independent ASTM committee for some time. This meeting was, therefore, called to determine the course of action to follow in the future.

While there are certain indications of a stronger need for ASTM activities in this area, it was considered more realistic to continue, if acceptable to them, under subdivisions of the ASTM Committee C-5 on Man-

ufactured Carbon and Graphite Products and D-30 on High Modulus Fibers and Their Composites.

It was, therefore, decided to approach these committees on this basis promptly and to place committee C-6 on an inactive status now until a satisfactory transfer has in fact been accomplished, and Committee C-6 can be discontinued.

Respectfully submitted on behalf of the committee,

R. J. DIEFENDORF,
Chairman

E. J. NOLAN,
Secretary

REPORT OF COMMITTEE C-7 ON LIME

Committee C-7 on Lime and its subcommittees held two meetings during the year: on June 24, 1969, in Atlantic City, N. J., and on Dec. 8, 1969, in Cincinnati, Ohio.

The committee consists of 58 voting members, of whom 29 are classified as producers, 5 as consumers, and 24 as general interest.

The committee was saddened by the passing of Victor J. Azbe, renowned lime plant consultant, last July in Calcutta, India.

Officers elected for the ensuing two-year term are as follows:

Chairman, C. E. Lovewell.

Vice-Chairmen, L. E. Halsted and J. G. Brisch.

Secretary, K. A. Gutschick.

The committee sponsored a one-day symposium on lime on June 23, 1969, in Atlantic City, N. J. The papers are included in STP 472, *The Reaction Parameters of Lime*.

J. I. Davison will receive the Award of Merit for his research on mortar curing at the June 1970 Annual Meeting in Toronto. R. F. Legget will receive the Walter C. Voss Award for his many contributions to building technology. This award honors the late Professor Voss who served as C-7 chairman from 1942-52.

The Society accepted a revised scope for the committee.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee C-7.2 on Structural Lime (V. S. Tadsen, chairman) is working on a revision to Specification C 207, for Hydrated Lime for Masonry Purposes, that would recognize both non-air-entraining and air-entraining hydrated limes for masonry purposes. The proposed revision was defeated in committee letter ballot and is now being restudied by the subcommittee.

Subcommittee C-7.3 on Industrial Uses (L. J. Yost, chairman) is considering a new specification for limestone for mineral feed and coal mine dusting.

Subcommittee C-7.5 on Methods of Test (J. Volk, chairman) is studying various analytical test methods for lime and limestone. It has developed a mechanical mixing procedure for lime putty to be balloted for inclusion in Method C 110, Physical Testing of Quicklime and Hydrated Lime. A classification of quicklimes by rate of reaction in the slaking-rate test is under consideration for inclusion in Method C 110.

Subcommittee C-7.7 on Pozzolans (L. J. Minnick, chairman) is nearing completion of a series of round-robin tests to evaluate various hydrated limes for use with fly ash in stabilizing granular materials. This information will be used to develop a new lime specification.

C-7.8 on Nomenclature (W. Walker, chairman) has nearly completed revision of Definitions C 51, Terms Relating to Lime.

Subcommittee C-7.9 on Research (D. D. Walker, chairman) will continue its mortarcuring study, using 70 percent relative humidity curing. Other areas of mortar study being considered are expansion, bond, and plasticity.

Subcommittee C-7.11 on Agricultural Liming Materials (C. Whittaker, chairman) will consider suggested editorial revisions to Specification C 602, for Agricultural Liming Materials.

Respectfully submitted on behalf of the committee,

C. E. LOVEWELL,
Chairman

K. A. GUTSCHICK,
Secretary

REPORT OF COMMITTEE C-8 ON REFRACTORIES

Committee C-8 on Refractories held two meetings during the year: on Oct. 2, 1969, at Bedford Springs, Pa., and on March 12, 1970, at Columbus, Ohio.

The committee consists of 52 voting members, of whom 26 are classified as producers, 18 as consumers, and 8 as general interest members.

The committee has been appointed the United States representative through the American National Standards Institute to COPANT (Pan American Standards Commission) and is actively reviewing five proposed standards being developed by this commission, utilizing a financial grant from the Refractories Institute for translation of these documents into English.

The ASTM Award of Merit was received by R. E. Birch, member of the committee since 1933, vice-chairman of the committee, and chairman of Subcommittee III.

The committee notes with deep regret the death of W. S. Debenhan, former chairman of the committee.

During the year the following new chairmen were appointed: T. Giles as chairman of Subcommittee XV and W. D. Fitzpatrick as chairman Section IIIG.

At the March 1969 meeting the following were nominated for officers of the committee and elected in the subsequent letter ballot:

Chairman, R. W. Limes

Vice Chairman, R. E. Birch

Secretary, L. J. Trostel, Jr.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee C-8 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which were accepted by the Society effective on the dates indicated:

New Standard:

C 649 - 70, Test for Hydration of Pitch-Bearing Basic Brick (Subcommittee IIIE (a)) (effective Feb. 27, 1970)

This test provides a method for measuring the relative hydration resistance of pitch-bearing basic brick when exposed to moist air.

Revision of Standards:

C 16 - 70 (formerly C 16 - 68), Testing Refractory Brick Under Load at High Temperatures (Subcommittee IIIA) (effective July 15, 1970)

A revision was made in the Note of Table 1 to indicate that temperatures shall be maintained within ± 20 F (10 C) of those prescribed in the Table during the heat-up schedule, and within ± 10 F (5 C) during the holding period.

C 20 - 70 (formerly C 20 - 46), Test for Apparent Porosity, Water Absorption, Apparent Specific Gravity, and Bulk Density of Burned Refractory Brick (Subcommittee IIIA) (effective Jan. 22, 1970)

Revised to generally tighten the temperature schedule tolerances allowed during the heating and holding periods of the test.

C 27 - 70 (formerly C 27 - 66), Classification of Fireclay and High-Alumina Refractory Brick (Subcommittee IX) (effective March 19, 1970)

Revised to add a retest clause.

C 107 - 70 (formerly C 107 - 67), Panel Spalling Test for High Duty Fireclay Brick (Subcommittee IIIB) (effective Feb. 27, 1970)

Change in Paragraph 5(d) to indicate use

REPORT OF COMMITTEE C-8

of five water spray units (was four for cooling panels).

C 122 - 70 (formerly C 122 - 67), Method of Panel Spalling Test for Super Duty Fireclay Brick (Subcommittee IIIB) (effective Feb. 27, 1970)

Change in Paragraph 5(d) to indicate the use of five water spray units.

C 134 - 70 (formerly C 134 - 41 (1961)), Tests for Size and Bulk Density of Refractory Brick (Subcommittee IIIG) (effective July 15, 1970)

This method was revised to incorporate Method C 437, for Size and Bulk Density of Insulating Fire Brick, which has been withdrawn.

C 154 - 70 (formerly C 154 - 41 (1961)), Test for Warpage of Refractory Brick and Tile (Subcommittee IIIG) (effective July 15, 1970)

This method was revised to include an additional paragraph in the Apparatus, giving the specifications for an optional wedge.

C 155 - 70 (formerly C 155 - 68), Classification of Insulating Fire Brick (Subcommittee IX) (effective March 19, 1970)

Revised to include a retest clause.

C 180 - 70 (formerly C 180 - 67), Panel Spalling Test for Fireclay Plastic Refractories (Subcommittee H) (effective Feb. 27, 1970)

Change in Paragraph 6(d) to indicate the use of five water spray units.

C 268 - 70 (formerly C 268 - 68), Test for Modulus of Rupture of Castable Refractories (Subcommittee IIH) (Feb. 27, 1970)

Change in Paragraph 8(b) to specify the needed oxidizing atmosphere in the test.

C 269 - 70 (formerly C 269 - 68), Test for Permanent Linear Change on Firing of Castable Refractories (Subcommittee IIH) (Feb. 27, 1970)

Change in Paragraph 8(c) to specify the needed oxidizing atmosphere in the test.

C 316 - 70 (formerly C 316 - 61), Classification of Single- and Double-Screened Ground Refractory Materials (Subcommittee IX) (effective March 19, 1970)

Revised to include a retest clause.

C 357 - 70 (formerly C 357 - 58 (1967)), Test for Bulk Density of Granular Refractory Materials (Subcommittee XV) (effective July 15, 1970)

Revisions were made in the Scope of this method

C 401 - 70 (formerly C 401 - 68), Classification of Castable Refractories (Subcommittee IX) (effective March 19, 1970)

Revised to include a retest clause.

C 416 - 70 (formerly C 416 - 67), Classification of Silica Refractory Brick (Subcommittee IX) (effective March 19, 1970)

Revised to include a retest clause.

C 435 - 70 (formerly C 435 - 68), Classification of Steel Pouring Pit Refractories (Subcommittee VII) (effective March 19, 1970)

Revised to include a retest clause.

C 436 - 70 (formerly C 436 - 67), Test for Reheat Change of Carbon Brick and Shapes (Subcommittee IIIG) (effective Feb. 27, 1970)

Revised description of linear measuring device.

C 455 - 70 (formerly C 455 - 62), Classification of Chrome Brick, Chrome-Magnesite Brick, Magnesite-Chrome Brick, and Magnesite Brick (Subcommittee IX) (effective March 19, 1970)

Revised to include a retest clause.

C 467 - 70 (formerly C 467 - 64), Classification of Mullite Refractories (Subcommittee IX) (effective March 19, 1970)

Revised to include a retest clause.

C 491 - 70 (formerly C 491 - 66), Test for Modulus of Rupture of Air-Setting Plastic Refractories (Subcommittee IIH) (effective Feb. 27, 1970)

Change in Paragraph 3(d) to specify the needed oxidizing atmosphere in the test.

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C 493 - 70 (formerly C 493 - 68), Test for Bulk Density and Porosity of Granular Refractory Materials by Mercury Displacement (Subcommittee IIIG) (effective Feb. 27, 1970)

Revised to include section on precision and other minor changes.

C 545 - 70 (formerly C 545 - 66), Classification of Zircon Refractories (Subcommittee IX) (effective March 19, 1970)

Revised to include a retest clause.

C 571 - 70 (formerly C 571 - 65), Chemical Analysis of Carbon and Carbon-Ceramic Refractories (Subcommittee IIIE) (effective Jan. 22, 1970)

Clarified steps in the procedure for loss on ignition.

C 572 - 70 (formerly C 572 - 65), Chemical Analysis of Chrome-Containing Refractories and Chrome Ore (Subcommittee IIIE) (effective Jan. 22, 1970)

Clarified steps in method of moisture.

C 573 - 70 (formerly C 573 - 65), Chemical Analysis of Fireclay and High-Alumina Refractories (Subcommittee IIIE) (effective Jan. 22, 1970)

Clarified steps in the procedure for loss on ignition.

C 574 - 70 (formerly C 574 - 65), Chemical Analysis of Magnesite and Dolomite Refractories (Subcommittee IIIE) (effective Jan. 22, 1970)

Clarified steps in the procedure for loss on ignition.

C 575 - 70 (formerly C 575 - 65), Chemical Analysis of Silica Refractories (Subcommittee IIIE) (effective Jan. 22, 1970)

Clarified steps in the procedure for loss on ignition.

C 576 - 70 (formerly C 576 - 65), Chemical Analysis of Zircon Refractories (Subcommittee IIIE) (effective Jan. 22, 1970)

Clarified steps in method of moisture.

C 605 - 70 (formerly C 605 - 67), Test for Reheat Change of Fireclay Nozzles and

Sleeves (Subcommittee IIIG) (effective Feb. 27, 1970)

Number of specimens increased from two to three to improve the test results.

C 606 - 70 (formerly C 606 - 67), Test for lap-Joint Strength of Refractory Mortars at Elevated Temperatures (Subcommittee IIHH) (effective Feb. 27, 1970)

Change in 5.1 to specify the needed oxidizing atmosphere in the test.

Withdrawal of Standard:

C 437 - 61, Test for Size and Bulk Density of Insulating Fire Brick (effective July 15, 1970)

C 437 has been replaced by C 134 - 70, Tests for Size and Bulk Density of Refractory Brick.

New standard C 649 and revised standards C 20, C 107, C 122, C 180, C 268, C 269, C 436, C 491, C 493, C 571, C 572, C 573, C 574, C 575, C 576, C 605, and C 606 appear in the 1970 *Annual Book of ASTM Standards*, Part 13. All other revisions will appear in the 1971 edition.

ACTIVITIES OF SUBCOMMITTEES

Section IIIE on Chemical Analysis (B. C. Ruprecht, chairman) noted the need from the U.S. Bureau of Standards for a new analytical standard sample for magnesite having an MgO content in the 96 to 98 percent range.

Section IIIF on Refractory Insulation (T. E. Brady, chairman) in studying refractory fibrous insulation recommended a close liaison with ASTM Committee C-16 on Thermal and Cryogenic Insulating Materials. Accordingly, W. C. Bohling of Section IIIF was appointed as the C-8 liaison member to C-16.

Section IIIN on Slag Testing (K. A. Baab, chairman) reported modifications in the drip slag test were proposed to satisfy the previous objections which should clear the way for submission of this test for ASTM Society approval.

Subcommittee IV on Heat Transfer (B. Hooper, chairman) has begun work revising Methods C 417 and C 438 for measuring thermal conductivity of castable refractories and plastic refractories to change them from

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single-point determinations to determinations at several hot face temperatures.

Subcommittee VII, Specifications (R. C. Burt, chairman) reported tentative agreement has been reached on a proposed end-use specification covering refractories for use in boilers. This should be offered to the committee for ballot in the fall of 1970.

Another specification is being developed for refractories used in incinerators.

Respectfully submitted on behalf of the committee,

A. W. ALLEN,
Chairman

L. J. TROSTEL, JR.,
Secretary

REPORT OF COMMITTEE C-9 ON CONCRETE AND CONCRETE AGGREGATES

Committee C-9 on Concrete and Concrete Aggregates held two meetings during the year: on June 25, 1969, during the Annual Meeting of the Society in Atlantic City, N. J., and on Dec. 5, 1969, in Williamsburg, Va.

Committee member Bruce Foster received the Frank E. Richart Award in 1969.

The committee adopted a joint C-1, C-9 memorial to Honorary Member Frank Jackson, who died in November 1968. The committee adopted a joint C-9, D-4 memorial to C-9 member J. E. Thompson who died on March 18, 1969. Charles Proudley, a member of the committee since 1940, died on Feb. 13, 1970. Alexander Klein, a member of the committee since 1960, died on Feb. 17, 1970. N. G. Smith, a member of the committee since 1960, died on Jan. 1, 1970.

The Sanford E. Thompson Award, established by the committee in 1938, will be made this year to Z. T. Jugovic and J. L. Gillam for their paper entitled, "Early Hydration Reactions of Abnormal Setting Portland Cement", published in the *Journal of Materials*, September 1968.

The officers elected for the ensuing term of two years are as follows:

Chairman, E. A. Whitehurst
Vice-Chairman, Paul Klieger
Secretary, Richard D. Walker

The committee consists of 277 active members who command 218 votes classified as 104 producers, 50 consumers, and 64 general interest. The committee presently has 11 honorary members, each of whom command a vote.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee C-9 submitted the following recommendations to the Society for action un-

der the Interim Procedure for Standards, which were accepted by the Society effective June 24, 1970:

Revision of Standards:

C 156 - 70 (formerly C 156 - 65), Method of Test for Water Retention Efficiency of Liquid Membrane-Forming Compounds and Impermeable Sheet Materials for Curing Concrete (Subcommittee III-g)

Substantial changes were made to improve the method in an attempt to reduce lab-to-lab variability.

C 403 - 70 (formerly C 403 - 68), Method of Test for Time of Setting of Concrete Mixtures by Penetration Resistance (Subcommittee III-n)

The precision statements were revised.

Reapproval of Standards:

C 215 - 60 (1970), Method of Test for Fundamental Transverse, Longitudinal, and Torsional Frequencies of Concrete Specimens (Subcommittee II-e)

The revised standards will appear in the 1970 *Annual Book of ASTM Standards*, Part 10.

AMERICAN NATIONAL STANDARDS

The following standards have been approved during the year as American National Standard by the American National Standards Institute:

C 29 - 69, ANSI A37.16-1970, Test for Unit Weight of Aggregate

C 31 - 69, ANSI A37.17-1970, Making and Curing Concrete Compressive and Flexural Strength Test Specimens in the Field

C 33 - 67, ANSI A37.124-1969, Specification for Concrete Aggregates

C 39 - 66, ANSI A37.18-1969, Test for

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- Compressive Strength of Molded Concrete Cylinders
- C 42 - 68**, ANSI A37.20-1969, Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
- C 87 - 69**, ANSI A37.129-1970, Test for Effect of Organic Impurities in Fine Aggregate on Strength of Mortar
- C 94 - 69**, ANSI A37.69-1970, Specification for Ready-Mixed Concrete
- C 116 - 68**, ANSI A37.24-1969, Test for Compressive Strength of Concrete Using Portions of Beams Broken in Flexure
- C 117 - 69**, ANSI A37.4-1970, Test for Materials Finer Than the No. 200 Sieve in Mineral Aggregates by Washing
- C 123 - 69**, ANSI A37.25-1970, Test for Lightweight Pieces in Aggregate
- C 127 - 68**, ANSI A37.5-1969, Test for Specific Gravity and Absorption of Coarse Aggregate
- C 128 - 68**, ANSI A37.6-1970, Test for Specific Gravity and Absorption of Fine Aggregate
- C 131 - 69**, ANSI A37.7-1970, Test for Resistance to Abrasion of Small Size Coarse Aggregate by Use of the Los Angeles Machine
- C 138 - 63 (1969)**, ANSI A37.27-1969, Test for Weight per Cubic Foot, Yield, and Air Content (Gravimetric) of Concrete
- C 142 - 67**, ANSI A37.28-1969, Test for Friable Particles in Aggregates
- C 143 - 69**, ANSI A37.29-1970, Test for Slump of Portland Cement Concrete
- C 157 - 69 T**, ANSI A37.78-1970, Test for Length Change of Cement Mortar and Concrete
- C 171 - 69**, ANSI A37.79-1970, Specification for Sheet Materials for Curing Concrete
- C 172 - 68**, ANSI A37.30-1970, Sampling Fresh Concrete
- C 173 - 68**, ANSI A37.80-1970, Test for Air Content of Freshly Mixed Concrete by the Volumetric Method
- C 227 - 69**, ANSI A37.130-1970, Test for Potential Alkali Reactivity of Cement-Aggregate Combinations (Mortar Bar Method)
- C 231 - 68**, ANSI A37.70-1969, Test for Air Content of Freshly Mixed Concrete by the Pressure Method
- C 233 - 69**, ANSI A37.131-1970, Testing Air-Entraining Admixtures for Concrete
- C 260 - 69**, ANSI A37.132-1970, Specification for Air-Entraining Admixtures for Concrete
- C 330 - 69**, ANSI A37.88-1970, Specification for Lightweight Aggregates for Structural Concrete
- C 331 - 69**, ANSI A37.89-1970, Specification for Lightweight Aggregates for Concrete Masonry Units
- C 332 - 66**, ANSI A37.90-1969, Specifications for Lightweight Aggregates for Insulating Concrete
- C 387 - 69**, ANSI A37.125-1970, Specifications for Packaged, Dry Combined Materials for Mortar and Concrete
- C 418 - 68**, ANSI A37.123-1969, Test for Abrasion Resistance of Concrete
- C 512 - 69**, ANSI A37.120-1970, Test for Creep of Concrete in Compression
- C 535 - 69**, ANSI A37.126-1970, Test for Resistance to Abrasion of Large Size Coarse Aggregate by Use of the Los Angeles Machine

ACTIVITIES OF SUBCOMMITTEES

All of the subcommittees have maintained a significant level of activity during the year. The activities of some of the subcommittees are noted in some detail as follows:

Subcommittee I-a on Cement and Concrete Reference Laboratory (H. F. Hedderich, chairman of C-9 portion of this C-1, C-9 subcommittee)—The CCRL activities continue to expand, particularly with regard to commercial laboratories. Many more architects' and engineers' specifications (still not enough of them) are requiring that the commercial laboratory for the project comply with ASTM Recommended Practice E 329, for Inspection and Testing Agencies for Concrete and Steel as Used in Construction, which in turn requires that the laboratory have CCRL inspection on each tour. This is required in at least one state, and is being considered in others. This indicates expanding confidence in the activities of CCRL and probably further requirements for the services of this organization.

Subcommittee II-c on Elastic and Inelastic Properties of Concrete (W. G. Mullen, chairman) continues to work in the area of

REPORT OF COMMITTEE C-9

development of tests for modulus of elasticity, Poisson's ratio, and time-dependent deformation of concrete as these properties affect values needed for design use. Presently, focus of the subcommittee is on behavior of concrete under high confining pressures such as might be found in a deep sea environment. Task Group I is active in developing for subcommittee use a state of the art report on triaxial loading of concrete.

Subcommittee II-h on Concrete for Radiation Shielding (H. S. Davis, chairman) is studying special shielding aggregates which are not covered in Specification C 637, for Aggregates for Radiation-Shielding Concrete, such as boron frit. Information is also being accumulated on the effects which heat and nuclear radiations have on the properties of radiation-shielding concrete.

Subcommittee III-b on Volume Change of Concrete and Concrete Aggregates (R. H. Brink, chairman) is considering two changes to Method C 157, Test for Length Change of Cement Mortar and Concrete: (1) better definition of the method as a laboratory rather than a field procedure, and (2) provision for testing other than 3 by 3-in. cross section specimens. Need for the first change is occasioned by the fact that volume change is influenced greatly by the conditions under which specimens are made and cured and, since it is difficult to maintain close control of such conditions in the field, it is deemed advisable to limit the preparation of specimens to laboratory conditions. The incentive for the second change arises when concrete containing aggregates larger than 1-in. maximum size is being studied.

The subcommittee has two active task groups; one engaged in developing a method of test for thermal expansion of concrete and the other concerned with a method of test for determining the early volume change of concrete beginning immediately after mixing.

Subcommittee III-c on Testing Fresh Concrete (R. D. Gaynor, chairman) has been working on a revision of Method C 231, Test for Air Content of Freshly Mixed Concrete by the Pressure Method. For the first time, the revised method will describe the operation and calibration procedures for both types of commercially available pressure

meters. Method C 138, Test for Weight per Cubic Foot, Yield, and Air Content (Gravimetric) of Concrete, has been extensively revised to permit consolidation by both rodding and internal vibration and to permit the use of a wider variety of unit weight containers including most commercially available pressure air-meter bases. The tolerances on dimensions on slump cones have been liberalized and the subcommittee has been reexamining the speed with which the cone is raised. Many ASTM methods for testing freshly mixed concrete contain limits on the maximum size of aggregate permitted. This has created special problems for the users of large aggregate and permit use of the conventional tests on the wet screened portion. Some time ago, the subcommittee considered a centrifuge method for determining the cement content of freshly mixed concrete. After being shelved for several years, the matter has again been brought to the attention of the subcommittee.

Subcommittee III-e on Testing and Specifications for Concrete Aggregates (D. L. Bloem, chairman) is currently working on two major projects. One is the development of "modulated" requirements for coarse aggregate to be incorporated into the Standard Specifications C 33, for Concrete Aggregates. The purpose is to provide realistically for the fact that test limits can be allowed to vary in their restrictiveness depending upon the type of construction in which the concrete is to be used and the severity of its exposure to the elements. Contemplated is a tabulation of limits for the conventional aggregate tests wherein the requirements will vary for twelve combinations of exposure severity and class of structural element.

The subcommittee is nearing completion of a proposed Method of Reducing Field Samples of Aggregate to Testing Size. This document will provide specific instructions on how to obtain the small portions of an aggregate sample needed for individual laboratory tests with reasonable assurance that the results for those portions will properly reflect the character of the field sample.

Subcommittee III-g on Materials Used in Curing Concrete (F. E. Legg, Jr., chairman) —Users of Method C 156, Test for Water Retention Efficiency of Liquid Membrane-

REPORT OF COMMITTEE C-9

Forming Compounds and Impermeable Sheet Materials for Curing Concrete, sometimes complain of inability to obtain testing agreement among laboratories evaluating the moisture retention capabilities of liquid membrane-forming concrete curing compounds. Recent studies by one of the members of the subcommittee indicate that misinterpretation of the proper method of preparation of the test mortar surface prior to application of the curing medium can lead to large variations in observed moisture loss. The subcommittee is recommending to Committee C-9 several improvements in the language of Method C 156 to remedy this deficiency and is also proposing requirements for the acceptability of a moisture retention test based on the concordance of results between three companion mortar specimens.

Subcommittee III-h on Chemical Admixtures (W. H. Price, chairman) is currently updating specifications on pozzolans, air-entraining agents, and chemical admixtures. A specification on admixtures for coloring of concrete is nearing completion. Work is well underway towards the establishment of test methods and specifications for admixtures used for the production of foamed concrete. All test methods used in the evaluation of admixtures are under study by the committee to evaluate their statistical reliability.

Subcommittee III-l on Ready-Mixed Concrete (F. F. Bartel, chairman) has the principal responsibility to keep up-to-date industry developments and maintain intent as understandable as possible in Specification C 94, for Ready-Mixed Concrete. Almost all ready-mixed concrete produced in the U.S. must comply with these specifications and since more than 60 percent of all portland cement produced is used by the ready-mixed industry, the influence of Specifications C 94 is far-reaching. Currently, changes to allowable tolerances in slump of concrete is one item being considered. Present tolerances, which have stood for 20 years, are workable when the addition of water to concrete is permitted on arrival at the construction site. However, some project specifications do not permit this practice, and then the require-

ments for slump in Specification C 94 cannot be met with practical regularity.

Subcommittee III-i also has in preparation a new specification for ready-mixed concrete produced by volumetric batching and continuous mixing equipment.

Subcommittee III-l on Miscellaneous Tests for Hardened Concrete (L. J. Minnick, chairman) is currently developing a revision of Method C 234, Test for Comparing Concretes on the Basis of the Bond Developed with Reinforcing Steel. The revision has been circularized to C-9 for comment. The subcommittee is also preparing a revision of Method C 232, Test for Bleeding of Concrete.

Subcommittee III-m on Testing Concrete for Resistance to Abrasion (M. E. Prior, chairman) has been studying three types of portable apparatus for the purpose of evaluating horizontal concrete surfaces. The three types are known as: (1) rolling balls, (2) dressing wheels, and (3) revolving disks. At the present time, it appears that it will be desirable to incorporate the three types in one method in order to evaluate properly surfaces of widely varying degrees of hardness. Laboratory and field tests will be conducted before making a final decision.

Subcommittee III-n on Testing Setting Time of Concrete (T. M. Kelly, chairman) has been endeavoring to refine and improve the precision statement in Method C 403-68, Test for Time of Setting of Concrete Mixtures By Penetration Resistance. A task group is developing a cooperative test program to provide data from which the precision and reproducibility of the test method can be determined. Additional data, provided by Subcommittee II-i, will also be analyzed for this purpose. Further consideration of the bond pin method for determining the setting time of concrete has been deferred pending development of additional data on the method.

Respectfully submitted on behalf of the committee,

E. A. WHITEHURST,
Chairman

PAUL KLIEGER,
Secretary

REPORT OF COMMITTEE C-11 ON GYPSUM

Committee C-11 on Gypsum held two meetings during the past year: one in Boston, Mass., on June 18 and 19, 1969, and the second meeting in San Diego, Calif., on Feb. 11 and 12, 1970.

The committee currently consists of 38 members of whom 31 are voting members; 15 are classified as producers, 6 as consumers, and 10 as general interest members; in addition, there are 6 alternates.

Current specifications under revision by Committee C-11 include ASTM designation C 473 and C 514. Method C 473, Physical Testing of Gypsum Board Products and Gypsum Partition Tile or Block, was last revised in 1968. Since then the committee has been reviewing the specification with a view toward the establishment of performance requirements for gypsum board products. Numerous round-robin tests have been conducted in an effort to establish proper limits. The committee anticipates completion of this work in the near future.

Specifications C 514, for Nails for the Application of Gypsum Wallboard, was last revised in 1964. Since this specification was developed the quality of nails for use with gypsum products has improved immeasurably. However, the committee has been advised that a revision is necessary in order to encompass recent developments in the nail industry and to provide for recent research. This specification is under complete revision and when completed it is expected to cover all types of nails for use with gypsum products. The proposed revision will also include the requirements for ASTM Specification C 380, for Annular Ringed Nails for Gypsum Wallboard, thereby, eliminating the need for two separate nail specifications. The committee expects to complete work on this project during the coming year.

The committee also has under study by

Subcommittee I various concrete form release agents. They are studying the effect on the bonding characteristics of gypsum plaster. In addition, Committee C-11 has completed its work on the standards for light gage steel studs and screws for use with gypsum products. Because of the conflict that developed over these specifications, it is expected that the chairman of Committee C-11 will appoint a liaison committee to work with representatives of Committee A-1 to upgrade these standards.

New committee officers elected to direct the activities of the committee for the next two years are as follows:

Chairman, G. W. Josephson

Vice-Chairman, R. L. Selbe

Secretary, Henry Omson

Executive Committee, C. E. Kallem, E. S. Newman, R. A. Kuntze, and J. A. Gillespie

At its February meeting our subcommittee on research unanimously agreed to develop and circulate to committee members information bulletins on current gypsum research underway in various laboratories throughout the world.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee C-11 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which were accepted by the Society effective on the dates indicated:

New Standard Specifications for:

C 645 - 70, Light Gage Steel Studs, Runners, and Rigid Furring Channels (Subcommittee XIX) (effective May 8, 1970)

C 646 - 70, Steel Drill Screws for the Application of Gypsum Sheet Material to Light

REPORT OF COMMITTEE C-11

Gage Steel Studs (Subcommittee II) (effective Oct. 15, 1970)

The new standards have been promulgated to provide standards urgently needed in the gypsum industry.

Adoption of Tentatives as Standard Without Revision:

Specifications for:

C 630 - 70 (formerly C 630 - 68 T), Water-Resistant Gypsum Backing Board (Subcommittee II) (effective Oct. 2, 1970)

C 631 - 70 (formerly C 631 - 68 T), Bonding Compounds for Interior Plastering (Subcommittee I) (effective Oct. 2, 1970)

Revision of Standards:

C 11 - 70 (formerly C 11 - 60), Definitions of Terms Relating to Gypsum (Subcommittee I) (effective Oct. 2, 1970)

C 35 - 70 (formerly C 35 - 67), Specifications for Inorganic Aggregates for Use in Gypsum Plaster (Subcommittee III) (effective Oct. 2, 1970)

C 37 - 69 (formerly C 37 - 67), Specification for Gypsum Lath (Subcommittee II) (effective Dec. 19, 1969)

C 472 - 69 (formerly C 472 - 68), Physical Testing of Gypsum Plasters and Gypsum Concrete (Subcommittee I) (effective Dec. 19, 1969)

C 472 - 70 (formerly C 472 - 69), Physical Testing of Gypsum Plasters and Gypsum Concrete (Subcommittee I) (effective Oct. 2, 1970)

The above revisions reflect modest changes that update the standards.

Reapprovals of Standards:

Specifications for:

C 61 - 64 (1970), Keene's Cement (Subcommittee I)

C 317 - 64 (1970), Gypsum Concrete (Subcommittee I)

C 475 - 64 (1970), Joint Treatment Materials for Gypsum Wallboard Construction (Subcommittee II)

C 514 - 64 (1970), Nails for Application of Gypsum Wallboard (Subcommittee I)

The new and revised standards will appear in the 1970 *Annual Book of ASTM Standards*, Part 9.

AMERICAN NATIONAL STANDARDS

The following standards have been approved during the year as American National Standard by the American National Standards Institute:

C 28 - 68, ANSI A49.3-1970, Specifications for Gypsum Plasters

C 36 - 68, ANSI A69.1-1970, Specifications for Gypsum Wallboard

Respectfully submitted on behalf of the committee,

G. W. JOSEPHSON,
Chairman

HENRY OMSON,
Secretary

REPORT OF COMMITTEE C-12 ON MORTARS FOR UNIT MASONRY

Committee C-12 on Mortars for Unit Masonry and its subcommittees held three meetings during 1969: on Jan. 7, in Washington, D. C., on June 25, in Atlantic City, N. J., and on Dec. 9, in Cincinnati, Ohio.

The committee consists of 75 voting members, of whom 36 are classified as producers, 19 as consumers, and 20 as general interest. There are no consulting members who do not have voting privileges.

Officers continuing the balance of a two-year term are:

Chairman, J. I. Davison

First Vice-Chairman, H. T. Toennies

Second Vice-Chairman, C. U. Pierson

Secretary, E. G. Hedstrom

Long time member E. J. Wechter was elected to the status of honorary member of Committee C-12.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee C-12 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which were accepted by the Society effective on the dates indicated:

Adoption of Tentatives as Standard Without Revision:

C 144 - 69 (formerly C 144 - 66 T), Specification for Aggregate for Masonry Mortar (Subcommittee C-12.4) (effective Dec. 19, 1969)

Revision of Standards:

C 144 - 70 (formerly C 144 - 69), Specifications for Aggregate for Masonry Mortar (Subcommittee C-12.4) (effective March 19, 1970)

C 404 - 70 (formerly C 404 - 61 (1969), Specifications for Aggregates for Masonry Grout (Subcommittee C-12.4) (effective March 19, 1970)

Revisions were made in Section 4.2.3 and 2.1 of C 144 and in Sections 5.3 and 2.1 in C 404.

Reapproval of Standards:

C 404 - 61 (1969), Specifications for Aggregates for Masonry Grout (Subcommittee C-12.4)

C 476 - 63 (1969), Specifications for Mortar and Grout for Reinforced Masonry (Subcommittee C-12.3)

The standards revised in 1969 appear in the 1970 *Annual Book of ASTM Standards*, Part 12. Those revised in 1970 will appear in the 1970 *Annual Book of ASTM Standards*, Part 10.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee 12.2 on Research (A. W. Isberner, chairman) is working to develop a test method of field testing on mortar.

Subcommittee 12.3 on Specifications (J. Lee, chairman) has prepared extensive revision to Specifications C 270, for Mortar for Unit Masonry.

Subcommittee 12.5 on Organic-Modified Mortars (R. D. Eash, chairman) has organized three task groups to prepare specifications to cover various levels of organic-modified mortars.

Respectfully submitted on behalf of the committee,

M. H. ALLEN,
Chairman

E. G. HEDSTROM,
Secretary

REPORT OF COMMITTEE C-13 ON CONCRETE PIPE

Committee C-13 on Concrete Pipe met in Memphis, Tenn., on Nov. 21, 1969.

Committee membership was 67 with a breakdown of 34 producers, 16 consumers, and 18 general interest members. Of the 67 committee members, 50 were present at the meeting.

The scope of Committee C-13 was revised as follows:

Article II, Scope, the scope of the committee shall include the formulation of specifications, methods of test for concrete pipe (reinforced and nonreinforced) and *factory made compression and self energizing joints* used for constructing sewers, culverts, and for irrigation and drainage.

The next meeting of the committee has been scheduled for San Diego, Calif., from Nov. 18 to 20, 1970.

The following were nominated and elected as the new officers of Committee C-13 and members of Executive Subcommittee 13.90:

Chairman, J. D. Lemons
Vice-Chairman, C. J. Cain
Secretary, R. E. Barnes
Assistant Secretary, M. Bealey

Executive Subcommittee Members, R. C. Longfellow, P. W. Manson, R. E. Morris, Jr., H. F. Peckworth, and F. A. Trautner

RECOMMENDATIONS ACCEPTED BY THE COMMITTEE ON STANDARDS

Subsequent to the 1969 annual report, Committee C-13 presented to the Society through the Committee on Standards the following recommendations, which were accepted effective on the dates indicated:

New Tentative Specifications for:

C 654-70 T, Porous Concrete Pipe (Subcommittee C-13.01) (effective May 8, 1970)

This standard was developed to fulfill

ASTM specification coverage of this product which is being used in construction.

C 655-70 T, Reinforced Concrete D-Load Culvert, Storm Drain, and Sewer Pipe (Subcommittee C-13.07) (effective May 8, 1970)

This specification covers reinforced concrete pipe designed for specific D-loads and intended to be used for the conveyance of sewage, industrial wastes, and storm water and for construction of culverts.

Withdrawal of Tentative Without Replacement:

C 477-65 T, Specification for Cast-In-Place Nonreinforced Concrete Agricultural Pipeline (Subcommittee C-13.03) (effective Dec. 24, 1969)

This specification was withdrawn under the 3-year rule for tentatives.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee C-13 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which were accepted by the Society effective on the dates indicated:

Revision of Standards:

Specifications for:

C 14-70 (formerly C 14-68), Concrete Sewer, Storm Drain, and Culvert Pipe (Subcommittee C-13.01) (effective Oct. 9, 1970)

Revisions include an increase in absorption limit in Section 6.2 and improved wording in Sections 8.3.1 and 8.3.2 with a new Section 9 added.

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C 76 - 69 (formerly C 76 - 68), Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe (Subcommittee C-13.02) (effective Dec. 18, 1969)

The revisions include modifications of Sections 5 and 6 to update the references on cement and steel reinforcement and also, the footnotes under Tables I through V were modified and improved.

C 76 - 70 (formerly C 76 - 69), Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe (Subcommittee C-13.02) (effective Oct. 9, 1970)

Revisions include an increase in the absorption limit in Section 21 (b) and further definition in Section 23 (b). The tables in Sections 25 (d), (e), and (f) were revised because of product innovations. Tables III and IIIA were revised to adjust Wall B steel to Wall A requirements.

C 118 - 69 (formerly C 118 - 68), Concrete Pipe for Irrigation or Drainage (Subcommittee C-13.03) (effective Dec. 18, 1969)

Section 8(b) was modified to allow the purchaser the option of specifying longer than maximum lengths.

C 118 - 70 (formerly C 118 - 69), Concrete Pipe for Irrigation or Drainage (Subcommittee C-13.03) (effective June 12, 1970)

Specification C 118 was revised to increase the maximum allowable absorption in Section 14.

C 361 - 70 (formerly C 361 - 68), Reinforced Concrete Low-Head Pressure Pipe (Subcommittee C-13.04) (effective Feb. 6, 1970)

Extensive and complete revision of Section 5.7 on Joints. A new Section 5.8 on Alternate Joint Design was added. Section 4.10.1 was modified to define gaskets as being of solid circular cross section.

C 361 - 70a (formerly C 361 - 70), Reinforced Concrete Low-Head Pressure Pipe (Subcommittee C-13.04) (effective June 12, 1970)

Sections 5.7.3 and 5.7.4.2 were revised and a new Section 9.4 was added to clarify

the specification and relate variations to present industry practice.

C 443 - 70 (formerly C 443 - 67), Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets (Subcommittee C-13.08) (effective Feb. 6, 1970)

The words "flexible, watertight" were eliminated from the title with similar revision in the Scope. The entire standard was revised to the modified decimal numbering system. The Shore durometer hardness limits were changed in Section 4.1 and wording and intent of the note was changed. Under Section 5, Design of Joints, 5.1, 5.1.4, 5.1.5, 5.1.6, 5.1.7, and Notes 1 and 2 were revised and edited. Section 6.1 was revised to improve and clarify the intent. In Section 8.1.1 the words "any leakage noted" were eliminated. Section 8.1.2 was also revised to improve and clarify the intent.

C 478 - 69 (formerly C 478 - 68), Precast Reinforced Concrete Manhole Sections (Subcommittee C-13.02) (effective Dec. 18, 1969)

Sections 5 and 6 were revised to update the references on cement and steel reinforcement.

C 478 - 70 (formerly C 478 - 69), Precast Reinforced Concrete Manhole Sections (Subcommittee C-13.02) (effective Oct. 9, 1970)

A revision was made to Section 20 to increase the absorption limit.

C 505 - 70 (formerly C 505 - 68), Nonreinforced Concrete Irrigation Pipe with Rubber Gasket Joints (Subcommittee C-13.03) (effective Feb. 6, 1970)

Reference to water hammer and surge were deleted from the Scope. In Section 7, the minimum cement content was changed from 6 to 5 bags. Section 28(b) was reworded to improve and clarify the intent and to specify how to test three or more units.

C 506 - 69 (formerly C 506 - 68), Reinforced Concrete Arch Culvert, Storm Drain, and Sewer Pipe (Subcommittee C-13.02) (effective Dec. 18, 1969)

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Sections 5 and 6 were revised to update the references to cement and steel reinforcement.

C 506-70 (formerly C 506-69), Reinforced Concrete Arch Culvert, Storm Drain, and Sewer Pipe (Subcommittee C-13.02) (effective Nov. 5, 1970)

Section 21(b) was revised to increase the absorption limit and Section 33 was deleted. Section 25(b) was revised to be in agreement with Specification C 76.

C 507-69 (formerly C 507-67), Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe (Subcommittee C-13.02) (effective Dec. 18, 1969)

Sections 5 and 6 were revised to update the references to cement and steel reinforcement.

C 507-70 (formerly C 507-69), Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe (Subcommittee C-13.02) (effective Nov. 5, 1970)

Section 21(b) was revised to increase the absorption limit and Section 25(b) was revised to be in agreement with C 76. To provide for design and product innovations Section 27(d) was revised and Tables I and II, and Figs. 5 and 6 were changed.

Methods of Test for:

C 497-70 (formerly C 497-67), Determining Physical Properties of Concrete Pipe or Tile (Subcommittee C-13.09) (effective Feb. 6, 1970)

In Section 5(a) the minimum rate of load application was changed from 1500 to 500 lb per min per lineal foot of pipe. New drawings of the three-edge-bearing test are included.

C 497-70a (formerly C 497-70), Determining Physical Properties of Concrete Pipe or Tile (Subcommittee C-13.09) (effective June 12, 1970)

Sections 14 and 17 were revised to clarify and obtain more reliable results from test procedures.

ACTIVITIES OF SUBCOMMITTEES

Executive Subcommittee C-13.90 (J. D. Lemons, chairman) met in Memphis, Tenn., on Nov. 19 and 20, 1969. The Executive Subcommittee recommended the continuation of E. F. Bespalow as ASCE Representative to Committee C-13.

The Executive Subcommittee received further correspondence from the board of directors of the American Concrete Pipe Association clarifying their position on the proposed Specification for Corrosion-Resistant Materials for the Protection of Concrete Pipe. This was referred to Subcommittee C-13.05 for deliberation together with a recommendation that this subcommittee proceed in accordance with the bylaws of Committee C-13 and the Society by submitting the proposed specification to subcommittee letter ballot and the ballot results to Committee C-13.

The Executive Subcommittee received correspondence concerning a current letter ballot of Committee A-1 on Steel and instructed the secretary by letter to the chairman of Committee A-1 to express the committee's concern with certain provisions in the letter ballot whereby shipment of oversize steel shall not be cause for rejection.

The Executive Subcommittee received correspondence from the Society concerning the ASTM Award of Merit and Honorary Membership and referred this to Subcommittee C-13.91 for evaluation and report.

After evaluation and review of the present ballot and voting procedures, the Executive Subcommittee recommended the following: (1) Actions of the subcommittees voted upon within the subcommittee shall be submitted to the secretary 4 months prior to the annual meeting, and (2) The secretary will circulate these items, along with the reasons for any subcommittee negative votes, to all C-13 members as soon after receipt as possible. The purpose of the new procedure is so each member of C-13 has an opportunity to review any negative votes cast within the subcommittee prior to discussion at the annual meeting. If a member of the committee, who is not a member of the subcommittee, is opposed to any recommendation of the subcommittee, he would have the option of

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circulating his comments to the full committee following receipt of the subcommittee actions.

Secretary Barnes submitted a complete report on membership attendance at the annual meeting and letter ballot returns for the past 3 years. After evaluation of these records, the Executive Subcommittee recommended that the secretary be instructed to write to those members who have not met the requirements of the C-13 bylaws on voting and attendance and inform them the termination of their membership is being considered. Since the inactive members are all general interest and consumer classifications, the Executive Subcommittee recommended the members of C-13 solicit new active members for these classifications.

The Executive Subcommittee was informed that Subcommittee C-13.01 would make a complete report on the Porous Pipe Specification at the meeting of C-13.

The activities of Subcommittee C-13.10 on correlation were discussed, and the Executive Subcommittee recommended that Subcommittee C-13.10 present its report to the full committee first and include in the report a motion for acceptance of all subcommittee reports concerned with correlation and for submittal to simultaneous letter ballot of the subcommittees and Committee C-13.

Subcommittee C-13.01 on Nonreinforced Sewer Pipe (C 14, C 444) (C. J. Cain, chairman) met in Memphis, Tenn., on Nov. 19, 1969. The subcommittee discussed revisions and letter ballots on Specification C 14 and submitted these items to Committee C-13 for letter ballot. The published tentative revision to Specification C 14 was also discussed and sent back to the task group for further consideration.

The Subcommittee discussed revisions and letter ballots on the new tentative Specification for Porous Concrete Pipe, and submitted the specification to Committee C-13 for letter ballot. It has been accepted by the Society under the designation C 654. The Subcommittee discussed the new absorption test and limits and submitted this to simultaneous letter ballot of Committee C-13 and the subcommittee.

Subcommittee C-13.02 on Reinforced Sewer and Culvert Pipe (C 76, C 478, C 506,

C 507) (E. F. Bespalow, chairman) met in Memphis, Tenn. on Nov. 21, 1969. The Subcommittee discussed revisions and letter ballots on the above specifications and submitted the items to Committee C-13 for letter ballot. Task groups were appointed and charged with considering revisions to Tables I and II of Specification C 507, Sections 24 and 27 of Specification C 76, and Tables II and III of Specification C 76. The subcommittee considered negative votes on Item 1 of the November 1968 letter ballot and sustained the negatives.

Subcommittee C-13.03 on Irrigation and Drain Pipe (C 118, C 505) (J. G. Hendrickson, chairman) met in Memphis, Tenn., on Nov. 20, 1969, and discussed revisions to the above specifications. The subcommittee considered the negative votes on Specification C 505 items on the November 1968 letter ballot and overrode the negatives. A task group was appointed and charged with considering revisions to Table I of Specifications C 118 and C 505.

Subcommittee C-13.04 on Low-Head Pressure Pipe (C 361) (G. B. Price, Jr., chairman) met in Memphis, Tenn., on Nov. 20, 1969, and discussed revisions to Specification C 361 and submitted these items to Committee C-13 for letter ballot. The subcommittee considered a negative vote on a Specification C 361 item in the November 1968 letter ballot and overrode the negative. A task group was appointed and charged with considering performance requirements to evaluate alternate joints.

Subcommittee C-13.05 on Corrosion Protection (H. F. Peckworth, chairman) met in Memphis, Tenn., on Nov. 20, 1969, and discussed draft III of the proposed Specification for Corrosion-Resistant Materials for the Protection of Concrete Pipe.

Subcommittee C-13.06 on Drain Tile (C 412) (P. W. Maeson, chairman) met in Memphis on Nov. 20, 1969. A task group was appointed and charged with considering proposed revisions to Specification C 412. The subcommittee submitted the proposed absorption test to Committee C-13 for letter ballot. Work will continue on the absorption test and durability.

Subcommittee C-13.07 on Acceptance Specifications (C 655) (R. E. Morris, Jr.,

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chairman) met in Colorado Springs, Colo., on July 8 and 9, 1969, and discussed revisions to draft IV of the proposed Tentative Specification for Reinforced Concrete D-Load Culvert Storm Drain and Sewer Pipe. The subcommittee met in Memphis, Tenn., on Nov. 19 and 20, 1969, and discussed draft V of the proposed tentative specification and submitted the specification to Committee C-13 for letter ballot. It has been accepted by the Society under the designation C 655.

Subcommittee C-13.08 on Rubber Gaskets (C 443) (C. A. Bluedorn, chairman) met in Memphis on Nov. 19, 1969. The subcommittee considered the negative votes on Specification C 443 on the November 1968 letter ballot and overrode all the negatives except those cast on the item dealing with deletion of the Note under the Scope which were sustained. A task group was appointed and charged with considering revisions to the Note, inclusion of a maximum hydrostatic head in the Scope, and also the recommendations submitted by the American Concrete Pipe Association. The standing task groups discussed their charges and progress.

Subcommittee C-13.09 on Methods of Test (C 497) (T. M. Murtaugh, chairman) met in Memphis on Nov. 20, 1969, and dis-

cussed revisions and letter ballots on Specification C 497 and submitted these items to Committee C-13 for letter ballot.

A task group was appointed and charged with considering references to C 42, methods of making cylinders from low slump concrete and the effect of moisture conditioning on core strength.

A task group was appointed and charged with considering pipe testing at low temperatures, rate of test loading, and deletion of Table I from Specification C 497.

The subcommittee considered a negative vote on a Specification C 497 item on the November 1968 letter ballot and overrode the negative.

Subcommittee C-13.10 on Correlation and Coordination (C. J. Cain, chairman) met in Memphis on Nov. 18, 1969, and discussed correlation of the specifications under Committee C-13 and submitted the correlated specifications to simultaneous letter ballot of Committee C-13 and the respective subcommittees.

Respectfully submitted on behalf of the committee,

J. D. LEMONS,
Chairman

R. E. BARNES,
Secretary

REPORT OF COMMITTEE C-14 ON GLASS AND GLASS PRODUCTS

Committee C-14 on Glass and Glass Products held two meetings during the year: on May 5, 1969, in Washington, D. C., and on Oct. 8, 1969, in Bedford Springs, Pa. In addition, the subcommittees held meetings in various locations as called by their chairmen.

The committee consists of 49 voting members of whom 17 are classified as producers, 18 as consumers, and 14 as general interest members.

New subcommittee chairmen, whose appointments were announced at the May meeting are:

Subcommittee I, Nomenclature and Definitions, G. E. Rindone.

Subcommittee VII, Glass Containers, J. B. Kepple to replace Marion Voss who resigned.

At the September meeting, the appointment of G. E. Rindone to be our liaison representative to Committee E-8 on Nomenclature and Definitions, and H. E. Powell to be our liaison representative to Task Group B on Thermal Expansion, Committee E-1 on Methods of Testing, was announced.

RECOMMENDATIONS ACCEPTED BY THE COMMITTEE ON STANDARDS

Subsequent to the 1969 annual report, Committee C-14 presented to the Society through the Committee on Standards the following recommendations which were accepted effective on the dates indicated:

New Tentative:

C 657 - 70 T, Method of Test for D-C Volume Resistivity of Glass (Subcommittee IV) (effective June 12, 1970)

This test determines the d-c volume resistivity of a smooth, preferably polished glass by measuring the resistances to passage of a small amount of direct current through

the glass at a voltage high enough to assure adequate resistivity.

The new tentative will appear in the 1971 *Annual Book of ASTM Standards*, Part 13.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee C-14 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which were accepted by the Society effective on the dates indicated:

Adoption of Tentatives as Standard Without Revision:

C 599 - 70 (formerly C 599 - 67 T), Specifications for Process Glass Pipe and Fittings (effective April 13, 1970)

C 600 - 70 (formerly C 600 - 67 T), Thermal Shock Test on Glass Pipe (effective April 13, 1970)

C 601 - 70 (formerly C 601 - 67 T), Pressure Test on Glass Process Pipe (effective April 13, 1970)

Revision of Standard:

C 147 - 69 (formerly C 147 - 62), Method of Internal Pressure on Glass Containers (Subcommittee VII) (effective July 18, 1969)

This method was revised to include a procedure for increasing the test pressure on a glass container at a predetermined constant rate, as distinguished from the previous method, which employed only a step-wise increase. This permits the use of recently developed test equipment, giving a faster and more efficient procedure for those who desire to use it.

The revision appears in the 1970 *Annual Book of ASTM Standards*, Part 13. All of

REPORT OF COMMITTEE C-14

the new standards will appear in the 1971 edition of Part 13.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee I on Nomenclature and Definitions (G. E. Rindone, chairman) had been inactive since the retirement of its former chairman in 1967. The new chairman, appointed in 1969, has started the review of C 162-66, Standard Definitions of Terms Relating to Glass and Glass Products, for reapproval or revision.

Subcommittee II on Chemical Analysis (P. F. Close, chairman) is divided into two task groups, one on instrumental methods and one on chemical methods. The instrumental group have had their members prepare outlines of their procedures for X-ray fluorescence analyses of glass. These are being reviewed and written into a format for an ASTM Suggested Practice for precision X-ray fluorescence analysis of glass. The chemical group has conducted a round-robin test of a proposed method for chemical analysis of silicate glasses. The results are being studied and written into a form for subcommittee review. Improved, faster, and more reproducible methods of glass analysis are desired by all laboratories.

Subcommittee III on Chemical Properties (F. R. Bacon, chairman) continues its work concerned with the purification of water for use as an extracting medium for chemical durability tests. They have reported that a recent study suggests that Method C 225 tests can be performed with more reproducibility if very high purity water prepared by ion exchange is employed. Cooperative tests have been started to assess a system utilizing charcoal filtration, nuclear-grade ion exchange, and millipore filtration.

Method C 225-68, Standard Methods of Test for Resistance of Glass Containers to Chemical Attack, includes Method P-W (the crushed sample test) in which alternative crushing procedures are described. The United States Pharmacopeia and The National Formulary employ this test in the specification of Type I, Type III, and Type NP glassware. It is not yet certain which crushing procedure will be used in the description of the test in USP XVIII and NF XIII, which will be issued early in 1970. The National Formulary has indicated a

preference to continue to use the mortar and pestle crushing procedure. Thus, this method has an important role in the specification of glass containers where chemical attack can occur, and it serves to protect consumers and users of products packaged in glass containers.

Subcommittee IV on Physical and Mechanical Properties (H. E. Hagy, chairman) met at the National Bureau of Standards on April 10 and 11, 1969. Drafts of methods of measuring various properties of glass, including d-c volume resistivity, density, working point, Knoop hardness, and strength were reviewed and discussed.

A series of talks on the advantages and difficulties in a concentric-ring test for the determination of the modulus of rupture of flat glass were heard. This method of test uses a ring-shaped knife edge to support the flat glass specimen. The load is applied by a smaller concentric ring. The result is to introduce a biaxial load on the center portion of the specimen so that edge-fracture origins are eliminated. Serious problems exist with this test when the center deflections of the specimen become large and it is not clear how to adequately handle strong, thin specimens. A first draft of the method in ASTM format was prepared by W. Capps, NBS, which will serve as a starting point for subcommittee discussions.

Since the April meeting, the draft of the Method of Test for D-C Volume Resistivity of Glass has been submitted to letter ballot by the main committee and approved. The draft on the working point of glass has been withdrawn by representatives of Owens-Illinois, who stated that the yield of data was meager for the time and effort required. Thus, this method will be abandoned. Drafts are being completed for subcommittee action on density, Knoop hardness, strength and stress-optical coefficient. The subcommittee must also consider the revision or reapproval of C 158-43 (1965), Standard Method of Flexure Testing of Glass, and examine tentatives for revision or reapproval as standards.

The continually increasing use of glasses in a wide variety of applications, ranging from lasers to structural materials, makes a knowledge of the physical properties of glasses essential to materials science and to

REPORT OF COMMITTEE C-14

the designer. Thus, standard methods of determining the physical properties are becoming of ever greater importance for all of these applications.

Subcommittee V on Glass Pipe (D. R. Briggs, chairman) reviewed the three tentatives under its jurisdiction and recommended for adoption as standard without revision for: C 599-67 T, Tentative Specification for Process Glass Pipe for Fittings, C 600-67 T, Tentative Method of Thermal Shock Test on Glass Pipe, and C 601-67 T, Tentative Method of Pressure Test on Glass Pipe. Main committee letter ballots on these items approved the subcommittee action and the recommendations were forwarded to the Society.

Subcommittee VI on Glass Construction Block and Tile—This subcommittee is inactive. However, the chairman of the main committee took action to review and submit to a main committee letter ballot the reapproval of C 240-61, Standard Methods of Testing Cellular Glass Insulating Block. The recommendation for reapproval has been forwarded to the Society. This, along with the standards on glass pipe above, represent two of the few areas in which Committee C-14 has considered writing specifications and test methods for particular products.

Subcommittee VII on Glass Containers (J. B. Kepple, chairman) revised and recommended a main committee letter ballot on C 147-62, Standard Method of Internal Pressure Test on Glass Containers. This action was approved by the main committee and accepted by the Society with an effective date of July 18, 1969. Action to review the following standards will be undertaken in 1970: C 148-85, Standard Methods of Polariscopic Examination of Glass Containers, C 149-50 (1965), Standard Method of Thermal Shock Test on Glass Containers, and C 224-56 (1965), Standard Method of Sampling Glass Containers. These methods

of test for glass containers are important in the fabrication of uniform products that will perform well and provide for the safety of the consumer.

Subcommittee VIII on Flat Glass (H. R. Swift, chairman) had no activity during the year.

Subcommittee IX on Standard Reference Glasses (N. M. Brandt, chairman) had no activity. The chairman reported that there is some interest among the manufacturers of safety glasses and goggles in methods of test, but no action was required at this time.

It was also reported that the joint recommendations of Subcommittee IV and IX that an extra dense lead glass, Corning Code 8463 or the equivalent, should be used as a multipurpose standard reference glass has been accepted by the Office of Standard Reference Materials, National Bureau of Standards, and that plans for the procurement of this glass are being made.

Subcommittee X on Glass Decorations (Aladar Burgyan, chairman) held meetings on March 26, 1969, and on Oct. 22 and 23, 1969, in Pittsburgh, Pa. Drafts of test procedures for decorations on architectural type glassware, for beer and beverage containers, for cosmetic glass containers, and for tableware and tumblers were prepared and submitted to the main committee for letter ballot. Negative votes on each of these procedures were received so the subcommittee is considering revisions to meet these objections.

This subcommittee represents a joint effort with the Society of Glass Decorators to develop procedures that will be accepted as standard methods in this area.

Respectfully submitted on behalf of the committee,

R. E. MOULD,
Chairman

G. W. CLEEK,
Secretary

REPORT OF COMMITTEE

C-15 ON MANUFACTURED MASONRY UNITS

Committee C-15 on Manufactured Masonry Units held two meetings during the year: on June 24, 1969, in Atlantic City, N. J., during the Annual Meeting of the Society, and on Dec. 8, 1969, in Cincinnati, Ohio, during ASTM Committee Week. The committee consists of 95 members of whom 46 are classified as producers, 18 as consumers, 31 as general interest members, with 31 consulting members.

Subcommittee IV on Prefaced Masonry Units was discontinued and the work covered by this subcommittee was put back in the other appropriate subcommittee. A new Subcommittee IV on Research on Masonry Units is being formed with Robert Dikkers appointed as chairman. R. W. Harrington was appointed chairman of Subcommittee V on Water Retardant Materials for Masonry Units.

A special congratulatory note was made on Committee C-15 member R. E. Copeland receiving the Walter C. Voss Award. Also Harry Plummer was made an honorary member of the Society in recognition of his many years of service and eminence in a field which the Society covers.

The committee deeply regrets to report the death of Frank Biberstein on April 30, 1969. Mr. Biberstein became a member of ASTM and Committee C-15 in 1943 and served as chairman from 1962 to 1968.

Chairman R. C. Valore, Jr., was appointed by the Society as ASTM representative to the A41 Building Code Requirement and Good Practice Recommendations for Masonry.

Officers elected for the ensuing term of two years are as follows:

Chairman, R. C. Valore, Jr.
First Vice-Chairman, K. W. Dunwoody
Second Vice-Chairman, S. B. Helms
Secretary, C. T. Grimm
Membership Secretary, L. L. Sphar

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee C-15 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which were accepted by the Society effective on the dates indicated:

New Standard:

C 652 - 70, Specifications for Hollow Brick (Hollow Masonry Units Made from Clay or Shale (Subcommittee C15.02) (effective May 29, 1970)

This specification covers hollow building and facing brick made from clay, shale, fire clay, or mixtures thereof and fired. Four types of hollow brick in each of two grades are covered.

Adoption of Tentatives as Standard Without Revision:

C 43 - 70 (formerly C 43 - 65 T), Definition of Terms Relating to Structural Clay Products (Subcommittee C15.02) (effective Feb. 27, 1970)

C 55 - 70 (formerly C 55 - 66 T), Specifications for Concrete Building Brick (Subcommittee C15.03) (effective Feb. 27, 1970)

C 129 - 70 (formerly C 129 - 64 T), Specification for Hollow Non-Load-Bearing Concrete Masonry Units (Subcommittee C15.03) (effective Feb. 27, 1970)

C 140 - 70 (formerly C 140 - 65 T), Method of Sampling and Testing Concrete Masonry Units (Subcommittee C15.03) (effective May 8, 1970)

C 145 - 70 (formerly C 745 - 66 T), Specification for Solid Load-Bearing Concrete Masonry Units (Subcommittee C15.03) (effective Feb. 27, 1970)

REPORT OF COMMITTEE C-15

C 426 - 70 (formerly C 426 - 66 T), Method of Test for Drying Shrinkage of Concrete Block (Subcommittee C15.03) (effective Feb. 27, 1970)

C 515 - 70 (formerly C 515 - 63 T), Specification for Chemical-Resistant Ceramic Tower Packings (Subcommittee C15.09) (effective March 19, 1970)

C 530 - 70 (formerly C 530 - 63 T), Specifications for Structural Clay Non-Load-Bearing Screen Tile (Subcommittee C15.02) (effective Feb. 27, 1970)

Adoption of Tentative as Standard with Revision:

C 90 - 70 (formerly C 90 - 66 T), Specification for Hollow Load-Bearing Concrete Masonry Units (Subcommittee C15.03) (effective May 8, 1970)

Adoption of Tentative Revision as Standard:

C - 126 - 70 (formerly C 126 - 69), Specification for Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units (Subcommittee C15.06) (effective March 19, 1970)

Reapprovals of Standards:

C 4 - 62 (1970), Specification for Clay Drain Tile

C 34 - 62 (1970), Specification for Structural Clay Load-Bearing Wall Tile

C 56 - 62 (1970), Specification for Non-Load-Bearing Tile

C 112 - 60 (1970), Method of Sampling and Testing Structural Clay Tile

C 212 - 60 (1970), Specification for Structural Clay Facing Tile

AMERICAN NATIONAL STANDARDS INSTITUTE

The following standards have been approved during the year as American National Standards by the American National Standards Institute:

C 32 - 69, A100.1-1970, Specification for Sewer and Manhole Brick (Made from Clay or Shale)

C 62 - 69, A98.1-1970, Specification for Building Brick (Solid Masonry Units Made from Clay or Shale)

C 126 - 69, A101.1-1970, Specifications for Ceramic Glazed Structural Clay Facing

Tile, Facing Brick and Solid Masonry Units.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee C15.02 on Clay Brick and Structural Clay Tile (J. G. Gross, chairman) met twice during 1969, and was successful in affecting revisions to C 216 and updating all the standards that are in this subcommittee's jurisdiction.

Subcommittee C15.03 on Concrete and Sand Lime Units (H. T. Toennies, chairman) met twice during 1969, and was successful in affecting major revisions to ASTM C 90. Revisions to Specifications C 145, C 129, and C 55 are being studied by the subcommittee. The subcommittee, at its December 1969 meeting, decided to develop three new standards describing prefaced concrete units, veneer "monumental" units, and silica flour for use in concrete units.

Subcommittee C15.06 on Glazed Brick and Tile (E. F. Wanner, chairman) submitted various revisions and additions to Specification C 126 which were approved by Committee C-15 at the June 24, 1969 meeting, subject to letter ballot of the entire committee. The results of this ballot will, no doubt, be presented at the ASTM Annual Meeting June 1970 for consideration by the Committee on Standards in accordance with ASTM Regulations. These changes were recommended by the Facing Tile Institute, which consists of member-manufacturers producing a very large percentage of ceramic glazed facing tile in the United States. The changes conform essentially to the current F.T.I. requirements which have been in effect since 1967. It has been the general practice of Subcommittee VI to consider and recommend, if approved, the F.T.I. specification changes after publication for several years in order to provide standardized unit requirements for the entire industry. This has been of particular importance to architects, engineers, and consumers since the product can be specified with the assurance that standardized sizes, shapes, and physical properties will be consistent throughout the industry. In general, the changes pertain particularly to improved test requirements and corresponding testing procedures to provide material of maximum safety and durability.

Subcommittee C15.09 on Chemical-Resist-

REPORT OF COMMITTEE C-15

ant Units (W. W. Perkins, chairman) is presently engaged in the consideration of a request to include cored brick in the chemical-resistant masonry section of ASTM Specification C 279. This matter is being submitted to subcommittee ballot.

Respectfully submitted on behalf of the committee,

R. C. VALORE, JR.,
Chairman

G. A. MELAND,
Secretary

REPORT OF COMMITTEE

C-16 ON THERMAL AND CRYOGENIC INSULATING MATERIALS

Committee C-16 on Thermal and Cryogenic Insulating Materials and its subcommittees held two meetings during the year: on Oct. 12 to 15, 1969, in Dearborn, Mich. and on March 8 to 11, 1970, in Atlanta, Ga.

The committee consists of 100 voting members, of whom 46 are classified as producers, 27 as consumers and 27 as general interest members.

The committee organization was changed in accordance with ASTM recommendations. Changes in subcommittee designations are as follows:

Former Designation	New Designation
C16.00	C16.00
C16.01	C16.90
...	C16.91
C16.02	C16.92
C16.04	C16.94
C16.05	C16.95
C16.06	C16.96
C16.20 and C16.23	C16.20
C16.24 and C16.25	C16.23
C16.33 and C16.34	C16.33

A new Subcommittee C16.91 on Awards and Recognition was formed with H. P. Hoopes as chairman.

The following changes to Committee C-16 by-laws were approved:

Article III, Section 6

"... but no organization may have more than one representative as a member of any specification subcommittee.

On subcommittees whose scope concerns primarily test methods, an organization may have no more than three representatives."

At the Atlanta meeting a Seminar on the Thermal Performance of Housing Systems was presented.

K. M. Ritchie was elected to honorary membership in Committee C-16.

The following changes in subcommittee officers were made:

A. W. Johnson replaced L. A. Barron as chairman of subcommittee C16.96.

J. D. McAllister was appointed chairman of the newly designated Subcommittee C 16.20. C. J. Smiley was elected secretary.

C. P. Welch was appointed chairman of Subcommittee C16.21.

W. A. Woolford was appointed chairman of Subcommittee C16.22. M. Sherman was elected secretary.

M. W. Keyes was appointed chairman of the newly designated Subcommittee C16.23.

D. E. Morgenroth was appointed secretary.

D. R. Flynn was appointed chairman of Subcommittee C16.30.

P. L. Losse was elected secretary of Subcommittee C16.31.

W. Gubar was elected secretary of Subcommittee C16.32.

A. J. Hoiberg was appointed chairman of the newly designated Subcommittee C16.33.

J. Mochel was appointed secretary.

J. Mochel was appointed chairman of an ad hoc committee on potential hazards associated with thermal insulation.

R. P. Tye was accepted as C-16 liaison to Committee D-20.

A. J. Hoiberg was accepted as C-16 liaison to Committee D-8.

The following were elected to office in C-16:

Chairman, F. A. Govan

First Vice-Chairman, H. P. Hoopes

Second Vice-Chairman, J. F. Corey

Secretary, W. A. Woolford

Assistant Secretary, S. L. Matthews

Membership Secretary, J. Volk

Member-at-Large, W. C. Turner

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report,

REPORT OF COMMITTEE C-16

Committee C-16 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which were accepted by the Society effective on the dates indicated:

New Standards:

C 647 - 69, Standard Guide for Properties and Tests of Mastics and Coatings for Thermal Insulation (Subcommittee C 16.34) (effective Dec. 19, 1969)

This guide is intended to aid in the review of significant properties, and test methods where applicable, of mastic and coating finishes for thermal insulation.

C 653 - 70, Recommended Practice for Determination of the Thermal Resistance of Low-Density Mineral Fiber Blanket-Type Building Insulation (Subcommittee C 16.30) (effective May 29, 1970)

This recommended practice is intended as a practical guide on how to determine the thermal resistance of low-density mineral fiber building insulation batts and blankets. The thermal resistance, R , of an insulation is used to describe its thermal properties as a product, and to calculate its thermal performance in use.

C 656 - 70, Specification for Structural Insulating Board, Calcium Silicate (Subcommittee C16.22) (effective July 15, 1970)

This specification covers inorganic structural insulating board used for the construction of ovens, dryers, insulators, etc., for temperatures up to 1200 F (650 C) and as an incombustible material for fire proofing applications. For specific applications, the actual temperature limit shall be agreed upon between the manufacturer and the purchaser.

Adoption of Tentatives as Standard Without Revision:

C 553 - 70 (formerly C 553 - 64 T), Specification for Mineral Fiber Blanket and Felt Insulation (Industrial Type) (Subcommittee C16.23) (effective May 29, 1970)

C 592 - 70 (formerly C 592 - 66 T), Specification for Mineral Fiber Blanket Insulation and Blanket-Type Pipe Insulation (Metal-Mesh Covered) (Industrial Type) (Subcommittee C16.24) (effective Jan. 22,

1970)

Adoption of Tentatives as Standard with Revision:

C 534 - 70 (formerly C 534 - 64 T), Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet Form and Tubular Form (Subcommittee C16.20) (effective March 6, 1970)

This specification was upgraded and updated as well as editorially revised.

C 612 - 70 (formerly C 612 - 67 T), Specification for Mineral Fiber Block and Board Thermal Insulation (Subcommittee C 16.20) (effective March 6, 1970)

This specification was revised because of the need for additional physical properties (surface burning, temperatures of use, and moisture adsorption) and appropriate test method references along with editorial changes.

Revision of Standard:

C 518 - 70 (formerly C 518 - 67), Method of Test for Thermal Conductivity of Materials by Means of the Heat Flow Meter (Subcommittee C16.30) (effective Jan. 22, 1970)

Necessary revisions were made to allow this method to be used for certification purposes.

Reapproval of Standards:

C 165 - 54 (1970), Method of Test for Compressive Strength of Preformed Block-Type Thermal Insulation

C 167 - 64 (1970), Methods of Test for Thickness and Density of Blanket- or Batt-Type Thermal Insulating Materials

C 488 - 64 (1970), Method for Conducting Exterior Exposure Tests of Finishes for Thermal Insulation

All of the new and revised standards appear in the *Annual Book of ASTM Standards*, Part 14.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee C16.20 on Preformed Block, Pipe Insulation, and Insulating Cement (J. D. McAllister, chairman)—Merger of old Subcommittees C16.20 and C16.23

REPORT OF COMMITTEE C-16

has made it necessary for the new C16.20 to retile and rescope. The new subcommittee with its expanded agenda has underway specification development for spray fiber insulation as well as an extensive program of upgrading documents (combining specifications into one document).

Subcommittee C16.21 on Reflective Insulation (C. P. Welch, chairman) has ready for submission to ASTM Headquarters a new Recommended Practice for Prefabricated Insulation Systems for Equipment and Pipe Operating at Temperatures Above Ambient Air. Concentration in other areas of reflective insulation involving building construction, cryogenic service, thermal transference as well as methods for physical properties continues.

Subcommittee C16.22 on Structural Thermal Insulation (W. A. Woolford, chairman)—Activity centers around a joint task group effort with ASTM Committee D-8 to develop a specification for mineral insulation board. Definitions relating to structural thermal insulation are also undergoing updating and upgrading.

Subcommittee C16.23 on Blanket and Loose Fill Insulation (M. W. Keyes, chairman)—The merger of subcommittees C 16.24 and C16.25 has made it necessary for new C16.23 to retile and rescope. To an ambitious program of specification development for building insulation blanket, high temperature blanket insulation, insulation for agricultural structures, aircraft insulation, and duct insulation, C16.23 has added specification work for various loose fill insulation.

Subcommittee C16.30 on Thermal Conductance (D. R. Flynn, chairman)—A cooperative effort with Subcommittee D20.22

of ASTM Committee D-20 was undertaken to arrive at a method for determining thermal conductivity of urethane foam that would meet the needs of D20.22 and satisfy the technical validity of C16.30. J. R. Barber's Cryogenic Task Force is doing excellent work and is preparing methods for homogeneous and multilayer insulation.

Subcommittee C16.31 on Special Thermal Properties (R. Tye, chairman) is concentrating effort around the test method for Hot Surface Behavior of High Temperature Thermal Insulation.

Subcommittee C16.32 on General Standards (H. J. Waite, chairman)—A test method for Evaluating Stress Corrosion Effect of Thermal Insulation on Stainless Steel has struggled through a series of drafts and now appears ready for final ballot. Tests for Parting Strength of Batt- and Blanket-Type Insulation as well as a revision to Method C 165 on compressive strength are under study.

Subcommittee C16.33, Vapor Transmission of, and Coatings and Coverings Relating to Thermal Insulation (A. J. Hoiberg, chairman)—The merger of subcommittees C16.33 and C16.34 has made it necessary for new C16.33 to retile and rescope. It is hoped that the 15th draft of the Recommended Practice for Vapor Barriers will successfully pass C-16 letter ballot prior to the 1970 Fall meeting. A classification system for Membranes for Moisture Barrier Mastics is being developed.

Respectfully submitted on behalf of the committee,

J. R. ALLEN,
Chairman

J. F. COREY
Secretary

REPORT OF COMMITTEE C-17 ON ASBESTOS-CEMENT PRODUCTS

Committee C-17 on Asbestos-Cement Products held two meetings during the year: on June 23, 24, and 25, 1969, at Atlantic City, N. J., and Jan. 27, 28, and 29, 1970, at Jackson, Miss. The Executive Committee and subcommittees met prior to the main committee at both locations.

Committee C-17 membership consists of 35 voting, 11 nonvoting, and 6 honorary members. The voting membership has 10 producers, 17 general interest, and 8 consumers. Since the last annual report, four members of Committee C-17 have resigned for various reasons and four new members have been elected to membership.

Except for the appointments of J. M. Woodward as chairman of the Subcommittee on Pipe to replace J. H. Swensen and D. L. Crawford to represent Committee C-17 on Committee D-20, all administration and the representatives to other committees remain the same as previously reported. Committee C-17 wishes to thank J. H. Swensen for a fine job as chairman of Subcommittee C-17.06.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee C-17 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which were accepted by the Society effective on the dates indicated:

New Standards:

- C 659 - 70**, Specification for Asbestos-Cement Plastic Foam Core Panels (Subcommittee C-17.05) (effective Aug. 14, 1970)
- C 663 - 70**, Specification for Asbestos-Cement Storm Drain Pipe (Subcommittee C-17.06) (effective Oct. 2, 1970)

Revision of Standards:

- C 296 - 69** (formerly C 296 - 67) Specifications for Asbestos-Cement Pressure Pipe (Subcommittee C-17.06) (effective July 18, 1969)

The revision consists of clarification of inspection and rejection of pipe lots.

- C 296 - 69a** (formerly C 296 - 69), Specification for Asbestos-Cement Pressure Pipe (Subcommittee C-17.06) (effective Sept. 19, 1969)

References to manufacturer's specifications were eliminated.

- C 296 - 70** (formerly C 296 - 69a), Specification for Asbestos-Cement Pressure Pipe (Subcommittee C-17.06) (effective Feb. 27, 1970)

The definition for coupling was revised to agree with Definitions C 460.

- C 428 - 69** (formerly C 428 - 67), Specifications for Asbestos-Cement Nonpressure Sewer Pipe (Subcommittee C-17.06) (effective Nov. 14, 1969)

The revision consists of the inclusion of a soundness test and the elimination of 6-in. pipe sizes.

- C 428 - 70** (formerly C 428 - 69), Specification for Asbestos-Cement Nonpressure Sewer Pipe (Subcommittee C-17.06) (effective Feb. 27, 1970)

The definition for coupling was revised to agree with Definitions C 460.

- C 500 - 69** (formerly C 500 - 67), Methods of Testing Asbestos-Cement Pipe (Subcommittee C-17.06) (effective Nov. 14, 1969)

REPORT OF COMMITTEE C-17

The revision consists of the addition of a straightness test method.

C 500 - 70 (formerly C 500 - 69), Method of Testing Asbestos-Cement Pipe (Subcommittee C-17.06) (effective Feb. 27, 1970)

The wording of the uncombined Ca(OH)_2 test was clarified.

C 508 - 70 (formerly C 508 - 67), Specification for Asbestos-Cement Perforated Underdrain Pipe (Subcommittee C-17.06) (effective Feb. 27, 1970)

The definition for coupling was revised to agree with Definitions C 460.

Reapproval of Standard:

C 459 - 63 (1970), Method of Sampling and Testing Asbestos-Cement Flat Sheets, Roofing, and Siding Shingles and Clapboard (Subcommittee C-17.04 and C-17.05)

ACTIVITIES OF SUBCOMMITTEES

Subcommittee C-17.01 on Nomenclature and Editorial (C. E. Norman, Jr., chairman)—Seven sections of Committee C-17 Bylaws are currently under study for proposed changes in the bylaws.

Subcommittee C-17.02 on Research (C. D. Fehnel, chairman)—Work proceeded in the following areas: (1) The task group evaluating the Canadian Color Stability Test as a possible ASTM test method is completing its round-robin series of tests, (2) The task group developing a test method to measure the chemical resistance of asbestos-cement pipe is continuing its evaluation of two proposed test methods. The original methods were expanded and modified to study the chemical resistance and volume change of the products in the presence of an alkali sulfate solution. Changes have been made in the soil burial test method so that it is now a more effective immersion type test, and (3) Long term, asbestos-cement canal bulkhead testing is being carried out in fresh and salt waters throughout the United States.

Subcommittee C-17.03 on International Standards (C. R. Hutchcroft, chairman)—On behalf of the American National Stand-

ards Institute, representing the United States, J. H. Swensen, of Committee C-17, attended a COPANT meeting in Santiago, Chile, and ISO/TC 77 in Munich, Germany. Reports covering the meetings were submitted to the membership of Subcommittee C-17.03 plus draft documents for consideration.

Comments were submitted to ISO/TC 77 on the first draft proposal for Selection of Asbestos-Cement Pipes Subject to External Loads With or Without Internal Pressure. Statements were also submitted by four other countries. The proposed modifications are being considered for revision in a meeting of Working Group 12.

It was recommended to ANSI that the United States vote affirmatively on Draft Recommendation No. 1260, Guide to the Use of ISO Recommendation R 390, Sampling and Inspection of Asbestos-Cement Products.

ISO/TC 77 was asked to consider the inclusion of "Glass Reinforced Mortar Pipe" in their scope, and asked ANSI for a United States expert. ASTM tentatively appointed J. Lainson, Western Plastics Corp., of Committee D-20 to this work. Alternatively, the work may be assigned to ISO/TC 5, Subcommittee 6 on Plastic Piping.

ISO/TC 77 appointed a working group relative to the establishment of dimensions and profiles on corrugated slates and shingles.

Subcommittee C-17.04 on Roofing and Siding (M. C. Armstrong, chairman)—Editorial changes in the three standards under this subcommittee's jurisdiction that include changes in format and addition of the metric system units have been developed. A task group is currently preparing a draft for a new standard to cover low-density mineral fiber siding materials.

Subcommittee C-17.05 on Flat Sheets, Corrugated, and Insulating Panels (R. M. Johnson, chairman)—New standard Specification C 659, for Asbestos-Cement Plastic Foam Core Insulating Panels, and Specification C 663, for Asbestos-Cement Storm Drain Pipe, have been adopted by the Society. Work on a standard for Asbestos-Cement Corrugated Canal Bulkhead has reached the final draft stage at the task force level. Editorial changes in existing standards

REPORT OF COMMITTEE C-17

to include metric units are complete and are being reviewed by Subcommittee C-17.01 for editorial approval.

Subcommittee C-17.06 on Pipe (J. M. Woodward, chairman)—Work on revisions to C 296, C 428, C 500, and C 508 has been completed and a new Specification C663, for Asbestos-Cement Storm Drain Pipe was developed. All the standards have been adopted by the Society. A proposed standard to cover asbestos-cement transmission pipe has been prepared by the task force and is in process. It will be submitted for Society action if approved by Committee C-17. A task group is currently collecting data on the relative crushing strength of asbestos-cement pipe as

determined by the various crush test methods described in C 500 - 67a. Recommendations are in preparation to submit pipe standards C 296, C 428, C 500, C 508, and C 644 to ANSI for adoption.

This report has been submitted to letter ballot of the committee, which consists of 35 voting members; 29 returned their ballots, of whom 29 have voted affirmatively and 0 negatively.

Respectfully submitted on behalf of the committee,

G. J. VERBECK,
Chairman

F. V. CAMARDA,
Secretary

REPORT OF COMMITTEE C-18 ON NATURAL BUILDING STONES

Committee C-18 on Natural Building Stones and its subcommittees held two meetings during the year: on Oct. 28, 1969, in Washington, D. C., and May 28, 1970, at Society headquarters. The Executive Committee also met Oct. 28, 1969, in Washington, D. C.

The committee consists of 42 voting members, of whom 19 are classified as producers, 6 consumers, 16 general interest, and 1 honorary member.

The bylaws of Committee C-18 were amended in July 1969 making provisions for honorary memberships. Another amendment was added, making the committee chairman responsible for preparing the agenda for all meetings of the committee and sending it to the members at least 30 days in advance of the meeting. Also, a single vote must be shared by members employed by the same organization.

Committee C-18 general interest member Frederick L. Knoblock, passed away on May 2, 1969. Mr. Knoblock had been Chief of General Services Administration, Specifications Division, until his retirement in 1961. He had actively served on Subcommittee C-18.02 on Nomenclature, and C-18.08 on Limestone.

The officers elected for the ensuing term of 2 years are as follows:

Chairman, S. A. Bortz

Vice-Chairman, J. H. Gibbud

Secretary, D. A. Hagerich

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee C-18 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which were accepted by the Society effective in 1970:

Reapproval of Standards:

- C 97 - 47 (1970)**, Method of Test for Absorption and Bulk Specific Gravity of Natural Building Stone (Subcommittee C-18.03)
- C 99 - 52 (1970)**, Method of Test for Modulus of Rupture of Natural Building Stone (Subcommittee C-18.02)
- C 120 - 52 (1970)**, Method of Flexural Testing of Slate (Modulus of Rupture, Modulus of Elasticity) (Subcommittee C-18.03)
- C 121 - 48 (1970)**, Method of Test for Water Absorption of Slate (Subcommittee C-18.03)
- C 170 - 50 (1970)**, Method of Test for Compressive Strength of Natural Building Stones (Subcommittee C-18.03)
- C 217 - 58 (1970)**, Method of Test for Weather Resistance of Natural Slate (Subcommittee C-18.03)
- C 241 - 51 (1970)**, Method of Test for Abrasion Resistance of Stone Subjected to Foot Traffic (Subcommittee C-18.03)
- C 406 - 58 (1970)**, Specification for Roofing Slate (Subcommittee C-18.04)

ACTIVITIES OF SUBCOMMITTEES

Subcommittee C-18.02 on Definitions and Nomenclature (L. W. Currier, chairman) proposed a revision of Definitions C 119 - 50, Terms Relating to Building Stones, approved by letter ballot of the committee on June 30, 1968, for submission to the Society. Because of a question raised on the footnote following the definition of Dimension Stone, a special meeting of the subcommittee was conducted at Society headquarters Nov. 14, 1969, followed by a subcommittee letter ballot on Jan. 23, 1970. A meeting of the committee in May 1970 will consider the proposed additional changes so that, if approved by full committee, they can be incorporated in the revised Definitions C 119

REPORT OF COMMITTEE C-18

in the 1971 *Annual Book of ASTM Standards*, Part 12.

Subcommittee C-18.03 on Test Methods (Arthur Hockman, chairman) is about complete in the development of a new abrasion hardness test method until such time as finances are available for conducting tests.

Subcommittee C-18.04 on Research (R. H. Jahns, chairman) has been focusing upon identifying the nature, objectives, and locales of current and recent research efforts relating to the properties and behavior of natural building stones with the ultimate objective of establishing a meaningful correlation between properties that can be evaluated by testing in commercial laboratories and the behavior of building stones in long-term use.

Subcommittee C-18.05 on Granite (R. H. Jahns, chairman)—As more data are made available through refinements in test procedures, Specification C 615, for Structural Granite, will be revised.

Subcommittee C-18.06 on Marble (R. W. Nauman, chairman)—Specification C 503 - 67 for Exterior Marble, remains the current standard until such time as development of new and updated information makes it necessary to revise the standard.

Subcommittee C-18.07 on Slate (W. F. Mullen, chairman)—Until such time as new test methods are developed, no work can proceed on improving Specification C 543 - 67, for Slate Blackboards, and Specification C 629 - 68, for Structural Slate, using test data obtained with the new procedures.

Subcommittee C-18.08 on Limestone (J. B. Patton, chairman) is considering proposing to Subcommittee C-18.03 on Test Methods revisions to several test methods at some future date. In addition, Subcommittee C-18.08 is also considering recommending the establishment of criteria related to the specific use of natural building stones.

Subcommittee C-18.09 on Sandstone (A. R. Krueger, chairman) is working on revisions to the recently revised C 119, for possible inclusion in the 1971 *Book of ASTM Standards*, Part 12.

Ad Hoc 1 on Building Stone Panels (S. A. Bortz, chairman) is conducting a study on natural building stone for composite use.

Ad Hoc 2 on Color and Coatings (James R. Dunn, chairman) was recently formed to begin studying color classifications and surface coatings of natural building stones.

Ad Hoc 3 on Financing and Development (W. F. Mullen, chairman) recently formed to find methods of financing and developing a testing program.

Ad Hoc 4 on Publicity (W. H. McDonald, chairman) recently formed to keep the natural stone industry and interested groups informed of Committee C-18 activities.

Respectfully submitted on behalf of the committee,

R. A. LAURENCE
Chairman

D. A. HAGERICH,
Secretary

REPORT OF COMMITTEE

C-19 ON STRUCTURAL SANDWICH CONSTRUCTIONS

Committee C-19 has been inactive during the past several years. In 1969 a survey was conducted by the Headquarters Staff to determine current and future interest in work on sandwich constructions in ASTM. This survey indicated interest in two specific diverse areas—aerospace structures and building construction.

As a result of the survey Committee F-7

on Aerospace Industry Methods and Committee E-6 on Performance of Building Constructions have been contacted to develop their interest in absorbing the C-19 activities in their areas of activity. During 1970 it is expected that action will be taken either to reactivate C-19 or to shift its activities to Committees F-7 and E-6.

REPORT OF COMMITTEE C-20 ON ACOUSTICAL MATERIALS

Committee C-20 on Acoustical Materials and its subcommittees held two meetings during the year: the 40th meeting at Columbus, Ohio, Sept. 24 to 26, 1969, and the 41st meeting at Cambridge, Mass., May 11 to 13, 1970.

The committee consists of 115 individuals of whom 105 are voting members; 49 are classified as producers, 9 as consumers, and 47 as general interest members. In addition, there are 4 consulting members to subcommittee C20.01 and 13 to subcommittee C20.03.

The following committee officers were elected for the ensuing term of two years:

Chairman, T. D. Northwood
Vice-Chairman, M. J. Kodaras
Secretary, Ron Moulder
Membership Secretary, Charles Rodman

The following subcommittee officers were also named during the year:

Secretary of Subcommittee C20.02, R. Benasutti
Chairman of Subcommittee C20.04, Guy LaLouche
Chairman of Subcommittee C20.05, H. Kingsbury
Secretary of Subcommittee C20.07, P. LeMasurier.

The following have been successfully balloted by the main committee and are in the process of being transmitted to the Society for action:

A recommendation for adoption as standard Recommended Practice, E 90-66 T, for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions, a recommendation to reapprove Method C 384-58, Test for Impedance and Absorption of Acoustical Materials by the Tube Method, and a recommendation to accept as tentative RM 14-2, Proposed Classifi-

cation for Determination of Sound Transmission Class.

A new Proposed Method of Test using a Tapping Machine for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1968 annual report, Committee C-20 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which were accepted effective on the dates indicated:

New Standards:

C 634-69, Definitions of Terms Relating to Acoustical Tests of Building Constructions and Materials (Subcommittee C20.07) (effective April 25, 1969)

These definitions were prepared in accordance with Society policy to promote uniformity in the terminology of building acoustics.

C 635-69, Specifications for Metal Suspension Systems for Acoustical Tile and Lay-In Panels (Subcommittee C20.04) (effective May 9, 1969)

C 636-69, Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels (Subcommittee C20.04) (effective May 9, 1969)

Specifications C 635 and Recommended Practice C 636 were prepared in response to requests from acoustical contractors for uniform standards for mechanical ceiling suspension systems.

REPORT OF COMMITTEE C-20

C 643 - 69, Method for Painting Ceiling Materials for Acoustical Absorption Tests (Subcommittee C20.01) (effective Sept. 19, 1969)

This is a recommended procedure for preparing acoustical materials for tests of effects of paint on acoustical performance.

Adoption of Tentatives as Standard with Revision:

C 522 - 69 (formerly C 522 - 63 T), Method of Test for Airflow Resistance of Acoustical Materials (Subcommittee C20.05) (effective July 18, 1969)

This method was revised throughout.

AMERICAN NATIONAL STANDARD

The following standard has been approved during the year as an American National Standard by the American National Standards Institute:

C 423 - 69, ANSI S1.7-1970, Method of Test for Sound Absorption of Acoustical Materials in Reverberation Rooms

ACTIVITIES OF SUBCOMMITTEES

Subcommittee C20.01 on Sound Absorption (H. J. Sabine, chairman) has reapproved Method C 384 - 58, but extensive revisions are now underway. Method RM 14-1 has met with strong opposition in balloting, and will no longer be published in Part 14 except as a reference. A new task group has been established to correlate the methods of absorption measurement in order to obtain better agreement among laboratories, to attain correlation of the reverberation room method with other methods, and to provide material to use in the rewriting of Method C 423. Other task groups are preparing methods for measuring sound attenuation of duct silencers and investigating a single number rating system for sound absorption which can replace the noise reduction coefficient (NRC).

Subcommittee C20.02 on Fire Performance (H. Omson, chairman) has enlarged its former scope of flame spread to include fire performance in general. It is their recommendation that smoke ratings should be given top priority in developing a test procedure.

Subcommittee C20.03 on Sound Transmission (K. S. Oliphant, chairman) has begun the preparation of a test method for evaluating the attenuation of ceiling materials and has begun to evaluate and rewrite Recommended Practice E 336 - 67 T, for Measurement of Airborne Sound Insulation in Buildings. The subcommittee is continuing the study of surface generated noises and also other impact test methods and is continuing its round-robin measurement of transmission loss on a leaded-vinyl specimen.

Subcommittee C20.04 on Application (Guy LaLouche, chairman) is studying procedures and details for fixed interior partitions of light frame types in regard to sound transmission. A new task group was appointed to write a recommended practice for the installation of operable folding and panel partitions for interior use.

Subcommittee C20.05 on Basic Properties (H. Kingsbury, chairman) has written a new draft on a method of rating the repaintability of acoustical products. The subcommittee is investigating a sag test and is studying possible revisions of Method C 522 - 69, Test for Airflow Resistance of Acoustical Materials.

Subcommittee C20.07 on Definitions (Ralph Huntley, chairman) has requested comments upon its recent new standard Definitions C 634 - 69, Terms Relating to Acoustical Tests of Building Constructions and Materials.

Respectfully submitted on behalf of the committee,

T. D. NORTHWOOD,
Chairman

W. SIEKMAN,
Secretary pro tem

REPORT OF COMMITTEE

C-21 ON CERAMIC WHITEWARES AND RELATED PRODUCTS

Committee C-21 on Ceramic Whitewares and Related Products held one meeting during the year: in Washington, D. C. on May 6, 1969. The committee consists of 85 voting members, of whom 24 are classified as producers, 15 as consumers, and 46 as general interest members.

At the 1969 Annual Meeting, Dr. John H. Koenig, a past chairman of Committee C-21, and a past member of the Board of Directors of the Society, was presented with the ASTM Award of Merit.

During 1969, Committee C-21 lost in death, Arno M. Illing, the hard-working charter chairman of Subcommittee C21.06 on Ceramic Tile. Mr. Illing was replaced by David J. Barbour.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee C-21 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which were accepted by the Society effective on the dates indicated:

New Standards:

C 627 - 70, Standard Method for Evaluating Ceramic Floor Tile Installation Systems (Subcommittee C21.06) (effective March 19, 1970)

This method covers the evaluation of ceramic floor tile installation systems, using the Robinson type floor tester.

C 648 - 70, Standard Method of Test for Breaking Strength of Ceramic Tile (Subcommittee C21.06) (effective March 6, 1970)

This test covers a procedure for determining the breaking strength of glazed ceramic

wall tile, ceramic mosaic tile, quarry tile, and paver tile, having a facial area of at least $3\frac{1}{2}$ in.² (22.6 cm²).

C 650 - 70, Standard Method of Test for Resistance of Ceramic Tile to Chemical Substances (Subcommittee C21.06) (effective March 19, 1970)

This method covers a procedure for determining whether, and to what degree, ceramic tile are affected by prolonged exposure to chemical substances.

These new standards will appear in the 1971 *Annual Book of ASTM Standards*, Part 13.

ANSI STANDARDS

The following standards were recommended for approval as American National Standards by the American National Standards Institute:

C 482 - 68, Test for Bond Strength of Ceramic Tile to Portland Cement

C 483 - 63, Test for Electrical Resistance of Conductive Ceramic Tile

C 484 - 66, Test for Thermal Shock Resistance of Glazed Ceramic Tile

C 485 - 68, Measuring Warpage of Ceramic Tile

C 499 - 66, Test for Facial Dimensions and Thickness of Flat, Rectangular Ceramic Wall and Floor Tile

C 501 - 66, Test for Relative Resistance to Wear of Unglazed Ceramic Tile by the Taber Abraser

C 502 - 66, Test for Wedging of Flat, Rectangular Wall and Floor Tile

C 609 - 67, Measurement of Small Color Differences Between Ceramic Wall or Floor Tile

C 627 - 70, Evaluation of Ceramic Floor Tile Installation Systems

REPORT OF COMMITTEE C-21

ACTIVITIES OF SUBCOMMITTEES

Subcommittee C21.91, Editorial (S. I. Warshaw, chairman) reviewed and approved the following items during 1969: the determination of the resistance of ceramic tile to chemical substances, the tentative method for the determination of the particle size distribution of alumina or silica, and the evaluation of ceramic floor tile installation systems.

Subcommittee C21.01 on Nomenclature (C. F. Hanks, Jr., chairman) reviewed by letter the Standard Definitions C 242-60, and the Tentative Definitions C 242-60 T.

Subcommittee C21.03 on Fundamental Properties (W. W. Perkins, chairman) held two meetings: one at Washington, D. C. on May 4, 1969, and the second at Bedford Springs, Pennsylvania, on September 25, 1969. Subjects discussed at the meetings included transverse strength, impact resistance, lead extraction tests, and thermal expansion test methods. Two ballots are pending. During the coming year, in addition to the continuing review of existing test methods, it is expected to take positive action on a moisture absorption test, following assimilation of the results of a round-robin test recently conducted.

Subcommittee C21.04 on Clays (Richard West, chairman) met in Washington, D. C. on May 4, 1969, and at Bedford Springs, Pennsylvania, on September 25, 1969. A computer evaluation of interlaboratory tests, concerning the measurement of particle size gradation, has been completed, and a method of test is being written. A questionnaire is being circulated concerning the relative importance of determining the mineral constitution of clays, and the methods employed. The possible revision of standard test methods and tentative test methods relating to clays was discussed. Improved testing methods will be submitted before the present testing methods are allowed to lapse.

Subcommittee C21.06 on Ceramic Tile (D. J. Barbour, chairman) met on May 4, 1969, in Washington, D. C., and on September 25, 1969, at Bedford Springs, Pennsylvania. Arno Illing, the hard-working charter chairman of Subcommittee VI, regrettably passed away and was replaced by David J. Barbour. The following test meth-

ods were approved by C-21 as ANSI Standards: C 482, C 483, C 484, C 485, C 499, C 501, C 502, and C 609. The results of an interlaboratory test brought about the writing of a test method for determining the resistance of ceramic tile to chemical substances. This test method was approved as a standard and also as an ANSI Standard. The test method for the evaluation of ceramic floor tile installation systems was accepted as Method C 627, and as an ANSI Standard. Method C 648, the test for determining breaking strength of ceramic tile (based on the results of interlaboratory tests) is ready to become a standard, pending the resolution of a negative vote over an editorial detail. Exploratory investigations on methods of measuring the abrasion resistance of glazed ceramic tile surfaces were continued, as well as those on the possibility of obtaining a meaningful test for impact resistance that would be adaptable to individual uninstalled tile as well as to a tile installation. Studies of stain resistance on unglazed floor tile were shelved due to the lack of a satisfactory method for measuring water absorptions below three percent. Color permanency studies are in the preliminary stages, with tile from several manufacturers being examined.

Subcommittee C21.07 on Non-Plastics (J. D. Zwicker, chairman) met on May 4, 1969, in Washington, D. C., and on October 17, 1969, in Bauxite, Arkansas. The tentative method for the use of the M.S.A. Particle Size Analyzer has been approved by the Editorial Committee and is now ready for a ballot of Committee C-21 as a whole. A tentative method for the use of the Coulter Counter has been approved by the subcommittee and will now be forwarded to the Editorial Committee for approval. Several round-robins have been held on the Fisher Sub-Sieve Sizer and one more is pending before a subcommittee vote is taken on the method. A revised version of the micromesh method, C 628, is under study as well as revisions to Method C 371.

Respectfully submitted on behalf of the committee,

W. C. MOHR,
Chairman

T. H. DRESSEL, SR.,
Secretary

REPORT OF COMMITTEE C-22 ON PORCELAIN ENAMELS AND RELATED CERAMIC METALS SYSTEMS

Committee C-22 on Porcelain Enamels and Related Ceramic Metal Systems, and its subcommittees met twice during the year: on August 28 and 29, 1969, at ASTM Headquarters in Philadelphia, Pa., and on March 5 and 6, 1970, in Cincinnati, Ohio. The committee consists of 102 members, of whom 78 are voting members: 39 are classified as producers, 7 as consumers, and 32 as general interest members. The committee has three honorary members and six consultants.

The committee has amended its bylaws to conform with the recent action of the Society revising its bylaws concerning classes of membership. A new section was also added to provide specific guidance concerning the nomination, election, and privileges of honorary members of the committee. The amendments were submitted to letter ballot of the committee and approved with no negative votes.

In October 1969, Committee C-22 sponsored a four-paper symposium entitled, Engineering Properties of Ceramic-Metal Systems, which was presented as one of the ASTM contributions to the ASM Materials Engineering Congress held in Philadelphia, Pa.

At the last Annual Meeting of the Society (June 1969) G. H. McIntyre received the ASTM Award of Merit.

We regret to report the accidental death of a committee member, J. C. Sawyer.

During the past year, J. S. Goodman has resigned as chairman of Subcommittee C-22.10 on Research, and has been replaced by B. J. Sweo.

The following officers have been elected by letter ballot of the committee for the term 1970-71:

Chairman, G. H. McIntyre.

First Vice Chairman, G. H. Spencer-Strong.

Second Vice Chairman, Leonard Maisel.
Secretary, W. E. Pierce.

S. W. Bradstreet and H. S. Ingham, Jr., were elected as members at large of Subcommittee C-22.90 (Executive).

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

New Standards:

C 660 - 70, Recommended Practices for Production and Preparation of Gray Iron Castings for Porcelain Enameling (Subcommittee C-22.40) (effective Aug. 14, 1970)

The recommended practice will serve as a guide to foundries producing gray iron castings for porcelain enameling.

C 664 - 70, Standard Methods of Test for Thickness of Diffusion Coating (Subcommittee C-22.60) (effective Oct. 2, 1970)

This standard provides two methods for measuring the thickness of coatings produced when an element or elements are made to react with or diffuse into, or both, the surface of a metal substrate, thus altering the surface of the substrate.

These new standards will appear in the 1971 *Annual Book of ASTM Standards*, Part 13.

ANSI STANDARDS

The following standards have been approved during the year as American National Standards by the American National Standards Institute:

C 282 - 67; ANSI Z167.4-1969, Methods of

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- Test for Acid Resistance of Porcelain Enamels (Citric Acid Spot Test)
- C 283 - 54 (1967); ANSI Z167.6-1969, Method of Test for Resistance to Porcelain Enameled Utensils to Boiling Acid
- C 285 - 54 (1967); ANSI Z167.16-1969, Sieve Analysis of Wet Milled and Dry Milled Porcelain Enamel
- C 286 - 66; ANSI Z167.1-1969, Definition of Terms Relating to Porcelain Enamel and Ceramic-Metal System
- C 313 - 59 (1967); ANSI Z167.5-1969, Methods of Test for Adherence of Porcelain Enamel and Ceramic Coatings to Sheet Metal
- C 314 - 62 (1967); ANSI Z167.9-1969, Method of Test for Flatness of Porcelain Enameled Panels
- C 346 - 59 (1967); ANSI Z167.11-1969, Method of Test for 45-Deg Specular Gloss of Ceramic Materials
- C 347 - 57 (1967); ANSI Z167.14-1969, Method of Test for Reflectivity and Coefficient of Scatter of White Porcelain Enamels
- C 374 - 60 (1967); ANSI Z167.10-1969, Method of Test for Fusion Flow of Porcelain Enamel Frits (Flow-Button Methods)
- C 375 - 58 (1967); ANSI Z167.2-1969, Classification of Waters Used in Milling of Porcelain Enamel
- C 385 - 58 (1967); ANSI Z167.18-1969, Method of Test for Thermal Shock Resistance of Porcelain-Enameled Utensils
- C 409 - 60 (1967); ANSI Z167.19-1969, Method of Test for Torsion Resistance of Laboratory Specimens of Porcelain Enameled Iron and Steel
- C 448 - 64 (1967); ANSI Z167.3-1969, Methods of Test for Abrasion Resistance of Porcelain Enamels
- C 486 - 67; ANSI Z167.17-1969, Method of Test for Spalling Resistance of Porcelain Enameled Aluminum
- C 536 - 67; ANSI Z167.8-1969, Method of Test for Continuity of Coatings in Glassed Steel Equipment by Electrical Testing
- C 537 - 67; ANSI Z167.15-1969, Method of Test for Reliability of Glass Coatings on Glassed Steel Reaction Equipment by High Voltage
- C 538 - 67; ANSI Z167.7-1969, Method of Test for Color Retention of Red, Orange, and Yellow Porcelain Enamels

C 539 - 66; ANSI Z167.13-1969, Method of Test for Linear Thermal Expansion of Porcelain Enamel Frits by the Interferometric Method

C 540 - 67; ANSI Z167.12-1969, Method of Test for Image Gloss of Porcelain Enamel Surfaces

ACTIVITIES OF SUBCOMMITTEES

Subcommittee C-22.10 on Research (B. J. Sweo, chairman) discussed the problems related to the porcelain enameling industry in terms of the information needed to understand the critical factors involved in the problem. Formal presentations followed by discussions were made concerning problems involving hairlining, chipping, and field repairs.

A task force investigated a program at Alfred University as a possible means of generating research information on problems of interest to the enameling industry and to the subcommittee. The program, known as Industrial Involvement, is limited to undergraduates. Work under the program requires funding by a sponsor; however, the cost is modest.

Future work will hinge about presentation and discussion of problem areas with emphasis placed on problem definition.

Subcommittee C-22.20 on Definitions and Nomenclature (E. E. Howe, chairman) continued its work on definitions and nomenclature relating to porcelain enamels and ceramic coatings on metal and was responsible for five new or revised definitions, which are being submitted to letter ballot of the committee.

Subcommittee C-22.30 on Education (W. E. Pierce, chairman) was responsible for the seminar on the Engineering Properties of Ceramic-Metal Systems held in October 1969 as a part of the Materials Engineering Congress.

A new and very popular activity of the subcommittee is a newsletter, *The Coating and Substrate Hot Line*, edited by Joseph Pitts and M. D. Burdick, which is sent quarterly to all Committee C-22 members.

Subcommittee C-22.40 on Materials and Materials in Process (D. A. Toland, chairman) is continuing the development of a method for the determination of weight loss during the pickling of decarburized enamel-

REPORT OF COMMITTEE C-22

ing steel in sulfuric acid. The successful application of cover-coat porcelain enamels directly to decarburized-enameling steels requires the removal of the surface layer of the steel sheet. The process is controlled by determination of weight loss in the acid pickling process. Since composition and micro-structure of the metal, as well as processing variables, affect the acid etch rate, it is hoped that the development of a standard test method will be of significance in the specification of both material and process.

The subcommittee is also investigating methods for determining the particle-size distribution of materials in porcelain-enamel slips; the yield strength of enameling steels after strain and enamel firing; resistance of porcelain enamels to hairlining; an autodilatometer method for measuring coefficient of expansion; and methods for determination of nickel-flash coatings on porcelain-enameling steels.

The subcommittee was responsible for the Recommended Practices for Production of Gray Iron Castings for Porcelain Enameling (C 660) previously reported.

Subcommittee C-22.50 on Finished Products (W. L. Gasper, chairman) has six active projects in process: (1) spall resistance test for porcelain enameled aluminum, (2) mineral acid test for porcelain enamel, (3) steam condensate test for porcelain enamel, (4) hot water resistance test for porcelain enamel, (5) continuity of coating test for general use, and (6) cleanability test for porcelain enamels.

A new task group is being formed to develop a method for determination of color differences in porcelain-enameled specimens.

A task group for the study of thermally induced stresses is authorized, but has not yet been formed.

The Cleanability of Coating Test noted above follows a test method developed by the Porcelain Enamel Institute research associates at the National Bureau of Standards, and is designed to make possible the measurement of the cleanability of not only porcelain-enamel coatings, but also organic coatings and plastics.

Subcommittee C-22.60 on High Temperature Coatings (Leonard Maisel, chairman) has fourteen active projects in process. They include work on the development of test methods for determining the: (1) oxidation of refractory alloy coatings, (2) oxidation resistance of super alloy coatings, (3) hot corrosion resistance, (4) thermal fatigue, (5) mechanical fatigue, (6) creep and stress rupture, (7) adherence and impact resistance of diffusion coatings, (8) thickness of coatings, (9) tensile bond test, (10) hardness and wear resistance, (11) thermal stress, (12) nomenclature, (13) size distribution of flame sprayed powders, and (14) thermal radiation properties.

The proposed test method for diffusion coatings previously discussed was developed by this subcommittee.

Four of the above methods have reached the round-robin stage.

This report has been submitted to letter ballot of the committee, which consists of 78 voting members; 53 members returned their ballots, of whom 53 have voted affirmatively and 0 negatively.

Respectfully submitted on behalf of the committee,

G. H. MCINTYRE,
Chairman

G. H. SPENCER-STRONG,
Secretary

REPORT OF COMMITTEE C-24 ON BUILDING JOINT SEALANTS

Committee C-24 on Building Joint Sealants and its subcommittees held two meetings during the year: on June 22 and 23, 1969, in Atlantic City, N. J., and Jan. 12 and 13, 1970, in Washington, D. C.

The Executive Committee has met four times: on June 23, 1969, in Atlantic City, on Oct. 7, 1969, in Philadelphia, on Jan. 12, 1970, in Washington, D. C., and again on March 31, 1970, in Philadelphia.

The committee consists of 110 members classified as follows: 43 producers, 26 consumers, and 41 general interest members. In addition, there are 36 nonvoting members.

Two new administrative subcommittees have recently been activated. These are C24.04 on Papers and Publications under the chairmanship of L. R. Carapellotti and C24.05 on Membership under the chairmanship of L. J. W. Heitmann.

The committee has been particularly honored this year by having one of its members singled out to receive the ASTM Award of Merit. R. W. McKinley, a charter member of the committee is the first C-24 member to be so honored.

The following changes have been made in subcommittee chairmen:

C24.01, L. J. Godet has replaced Philip Maslow

C24.02, A. D. Ray has replaced J. T. Rice

C24.30, J. J. Giordano has replaced J. S. Mays

C24.50, J. J. Higgins has replaced V. V. Raimondi

C24.72, Jack Arnold has replaced M. A. Bedics

The following officers were elected recently for the ensuing two-year term:

Chairman, R. W. Pursifull

2nd Vice-Chairman, Harry Kelfer

General Secretary, R. H. Barton

Membership Secretary, F. L. Miller

1st Vice-Chairman, L. J. W. Heitmann
J. R. Panek and Arthur Hockman have been selected as Members at Large with six-year terms.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee C-24 submitted the following recommendations to the Society for action under the Interim Procedure for Standards which became effective on the dates indicated:

Adoption of Tentative as Standard Without Revision:

Method of Test for:

D 2450 - 69 (formerly D 2450 - 67 T), Bond of Oil and Resin Base Caulking Compounds (Subcommittee C24.10) (effective Dec. 19, 1969)

D 2451 - 69 (formerly D 2451 - 67 T), Degree of Set for Face Glazing and Bedding Compounds on Metal Sash (Subcommittee C24.12) (effective Dec. 19, 1969)

D 2452 - 69 (formerly D 2452 - 67 T), Extrudability of Oil and Resin Base Caulking Compounds (Subcommittee C24.10) (effective Dec. 19, 1969)

D 2453 - 69 (formerly D 2453 - 67 T), Shrinkage and Tenacity of Oil and Resin Base Caulking Compounds (Subcommittee C24.10) (effective Dec. 19, 1970)

Adoption of Tentative as Standard with Revision:

C 509 - 70 (formerly C 509 - 66 T), Specification for Cellular Elastomeric Preformed Gaskets and Sealing Material (Subcommittee C24.72) (effective May 29, 1970).

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This specification describes the quality level of cellular elastic compounds manufactured in preformed shapes for use as gasket sealing materials primarily for building applications in the form of compression seals. This standard will appear in the 1970 *Annual Book of ASTM Standards*, Parts 14, and 28.

C 542 - 69 (formerly C 542 - 65 T), Specification for Elastomeric Structural Glazing and Panel Gaskets (Subcommittee C24.70) (effective Oct. 17, 1969)

This specification was revised in accordance with industrial needs and Society requirements on tentatives.

Revision of Standards:

C 564 - 70 (formerly C 564-68) Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings (Subcommittee C24.74) (effective May 29, 1970)

This specification defines the required properties of preformed rubber gaskets used to seal joints in cast iron soil pipe and fittings. The revisions include an appendix comprised of Rubber Manufacturers Association, Inc., tolerances, RMA Class 3 dimensional tolerances to be used as a guide for cross-sectional dimensions together with a ± 1 percent limit on dimetral dimensions; additional guidance in sampling procedures and modification of sample preparation techniques, plus an oil immersion test. This specification appears in the 1970 *Annual Book of ASTM Standards*, Parts 2, 14, and 28.

AMERICAN NATIONAL STANDARDS

The committee recommends the following standards be submitted to the American National Standards Institute for approval as American National Standard:

Method of Test for:

D 2450 - 69, Bond of Oil and Resin Base Caulking Compounds.

D 2451 - 69, Degree of Set for Face Glazing and Bedding Compounds on Metal Sash.

D 2452 - 69, Extrudability of Oil and Resin Base Caulking Compounds.

D 2453 - 69, Shrinkage and Tenacity of Oil and Resin Base Caulking Compounds.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee C24.01, on Nomenclature and Editorial (L. J. Godet, chairman) has developed and is refining a list of ten definitions that were turned down in a main committee ballot. The subcommittee will maintain more active liaison with other C-24 subcommittees to give immediate attention to nomenclature needs. They will also investigate the feasibility of originating nomenclature specific to the field of sealants where universally used terms too often do not have a universally understood meaning.

Subcommittee C24.10 on Oil and Resin Based Caulks (H. Rosenblatt, chairman) is now considering a number of negative votes that were sustained on a main committee ballot of a Specification for Caulking Compounds, Oil and Resin Base Type. This will be available shortly for submission to the Society.

Subcommittee C24.12 on Oil and Resin Based Glazing Compounds (S. S. Painter, chairman) has prepared a Specification for Glazing Compounds, Sash, Metal for Back Bedding, and Face Glazing which has been submitted for main committee ballot and will be ready shortly for submission to the Society. The subcommittee is actively working on test methods for use in a Channel Glazing Specification. Work is also going forward on recommended practices for face glazing and channel glazing.

Subcommittee C24.16 on Emulsion Compounds (D. E. Schendel, chairman) has completed work on test methods to be used with latex caulks. These are for the measurements of extension-recovery, staining, extrudability, tack-free time, volume shrinkage, weatherometer testing, slump, and low temperature flexibility. These have been submitted to the entire subcommittee membership for comment and test methods should be finalized and available for the main committee action during 1970.

Because of significant differences noted between acrylic and poly(vinyl alcohol) caulks, there appears to be the need of a two-part specification or two separate specifications in order to describe both materials adequately.

REPORT OF COMMITTEE C-24

Subcommittee C24.18 on Solvent Release Compounds (W. C. Aberth, chairman) has prepared test procedures on a bubble test, a low-temperature tenacity test, an ultraviolet-cold box exposure, and a shrinkage test which will be submitted to subcommittee letter ballot. Good progress is also reported in development of a recommended practice. The group continues to survey specifications prepared by other groups.

Subcommittee C24.30 on Curing Methods for Testing Chemically Curing Compounds (J. J. Giordano, chairman) continues to occupy itself with determining whether curing conditions called for in present Federal Specification TT-S-00230b are broad enough to provide adequate cures for one-part elastomeric type sealants. A series of round-robin tests are projected which will occupy most of the coming year.

Subcommittee C24.32 on Test Methods for Chemically Cured Compounds (Arthur Hockman, chairman) has seven active groups working on hardness properties, weight loss, tack-free time, durability, peel strength, recommended practices, and clarification of some sealant terms. A test for tack-free time is currently in main committee ballot. Tests of weight loss, peel strength, and durability will shortly be prepared.

Subcommittee C24.34 on Specifications for Chemically Cured Compounds (E. V. Gibbons, chairman) continues to review ANSI Specification A116.1-1967 to up-date it and convert it to ASTM format. A Task Group on Recommended Practices has been formed and is currently at work. The preparation of a specification on single component sealants has been held in abeyance until work on a number of test methods is nearer completion.

Subcommittee C24.50 on Tapes (J. J. Higgins, chairman), has two active task groups. Task Group A, concerned with Non-cured, Nonresilient Preformed Tapes has prepared three test procedures for oil migration, low-temperature flex, and adhesion-impact. These will shortly be balloted through the subcommittee. Task Group B,

concerned with Semi-resilient and Resilient Preformed Sealing Tapes has agreed upon some seven preliminary test methods and plans to commence round-robin testing on these procedures in the immediate future.

Subcommittee C24.70 on Lock Strip Gaskets (E. C. Fetter, chairman) is currently involved in a revision to C 542-69 which involves modification of the lip seal pressure. They hope to be able to resolve several negatives drawn on a main committee ballot. A task group is actively engaged in the development of a standard on Recommended Practices for Lock Strip Gaskets and the completed effort will shortly be available for subcommittee appraisal. Another task group is developing a test for Structural Capacity for a Lock Strip Gasket. It is hoped that significant progress will be made in this area during the coming year.

Subcommittee C24.72 on Compression Seal Gaskets (Jack Arnold, chairman) with the completion of C 509-70, is actively working on the specification for a Dense Elastomeric Compression Seal Gasket and accessories which is currently in subcommittee ballot status. Work is also preceeding on a document for Recommended Practices for Compression Seal Gaskets and a draft should be available for subcommittee review by the June meeting.

Subcommittee C24.74 on Pipe Gaskets (T. C. Brown, chairman) feels that the recently revised C 564-70 brings the specification in harmony with current industrial practice. A task force of industry representatives are carrying out a round-robin compression set test to evaluate the modified compression set test developed by John Cornish of Raybestos-Manhattan. Other task groups are working on definitions applicable to pipe gaskets and on recommended practices.

Respectfully submitted on behalf of the committee,

R. W. PURSIFULL,
Chairman

R. H. BARTON,
Secretary

REPORT OF COMMITTEE

C-26 ON_FUEL, CONTROL, AND MODERATOR MATERIALS FOR NUCLEAR REACTOR APPLICATIONS

Committee C-26 on Fuel, Control, and Moderator Materials for Nuclear Reactor Applications is a new activity of the Society. It held its organization meeting in November 1968 and, during 1969-70 the emphasis was in getting the subcommittee operations underway.

During the period Subcommittee I met three times: on June 23, 1969, at Atlantic City, N. J. with Subcommittee II, on Dec. 2, 1969, at San Francisco, Calif., and on May 5, 1970, at ASTM Headquarters, Philadelphia, Pa., in conjunction with the 1970 C-26 annual meeting, May 4-6. This annual assembly included meetings of the main committee and of Subcommittees II, III, (which had its organization meeting on Oct. 15, 1969, at ASTM Headquarters), and IV. Subcommittee V met on March 18-20, 1970, at San Diego, Calif.

The next meeting of Committee C-26 is planned to coincide with the meeting of the ANSI Committee N11 on Basic Materials and Materials Testing Involved in Nuclear Applications, during the ASTM January 1971 Committee Week, Fort Lauderdale, Fla.

The committee currently consists of 81 participating members.

The officers of the committee elected to serve for the years 1970-1972 are as follows:

Chairman, Harlan J. Anderson.

Vice-Chairmen, L. T. Corbin and Raymond Cooperstein.

Secretary, W. M. Pardue.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee I, Executive (Harlan J. Anderson, chairman)—As noted above, the subcommittee met three times during the year in Atlantic City, San Francisco, and in

Philadelphia, to receive progress reports on the work underway from the subcommittees, to review priorities on these projects and man-power requirements, and to evaluate the subcommittee organization. The subcommittee will next meet during the ASTM January 1971 Committee Week in Fort Lauderdale, Fla.

Subcommittee II on Fuels (F. J. Miner, chairman) met twice this year in Atlantic City and Philadelphia on the dates shown above. The subcommittee organization consists of four task groups as follows: Plutonium Metal (F. J. Miner, chairman), Plutonium Nitrate (W. L. Lyon, chairman), Plutonium Oxide (J. F. Soppet, chairman), and Mixed Oxides (J. M. Kerr, chairman). A standard specification for nuclear grade plutonium metal, approved by subcommittee ballot in January, 1970, is being balloted by the main committee preparatory to its submittal for approval by the Society. Draft specifications were reviewed at the May meeting and are nearly ready for $\text{PuO}_2\text{-UO}_2$ mixed oxides and plutonium nitrate. The drafting of a specification for PuO_2 powder is getting underway.

Subcommittee III on Control Materials (Louis Frank, chairman)—As noted above the organization meeting for the subcommittee was held in Philadelphia, Pa., in October 1969. Data presented at the time indicated the type of control materials presently specified in over 30 representative commercial power plants. The Ag-Cd-In control materials are prominent in PWRs and B&C was found most prominent in BWRs. It was agreed that standard specifications will be developed for these control materials and that additional members should be solicited for this subcommittee. At the May 1970 meeting in Philadelphia, first draft specifica-

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tions were submitted and reviewed on the three following combinations: Ag-Cd-In, B₂C powder, and B₂C pellets.

Subcommittee IV on Moderator Materials (Raymond Cooperstein, chairman)—Although the May 1970 meeting of the subcommittee in Philadelphia was its first formal meeting, the members have been carrying the work forward by phone and mail. A standard specification for BeO moderator material was agreed upon, and a draft specification was ready for discussion at the May meeting. Suggestions for improvement were obtained for use in the next draft.

Subcommittee V on Test Methods (L. T. Corbin, chairman)—As indicated above, the subcommittee met in San Diego, Calif. in March. The subcommittee is reviewing and evaluating analytical and physical test methods and sampling procedures applicable to the fuel material specifications being developed under Subcommittee II.

Respectfully submitted on behalf of the committee,

HARLAN J. ANDERSON,
Chairman

W. M. PARDUE,
Secretary

REPORT OF COMMITTEE

D-1 ON PAINT, VARNISH, LACQUER, AND RELATED PRODUCTS

Committee D-1 on Paint, Varnish, Lacquer and Related Products held two meetings during the year: on June 23 to 25, 1969, in Atlantic City, N. J., in connection with the Annual Meeting of the Society and on Jan. 12 to 14, 1970, in Cincinnati, Ohio. In addition, the Joint-Federation Committee on Paint, Varnish and Lacquer met in Chicago, Ill., on Nov. 7, 1969, in connection with the 1969 Annual Meeting of the Federation of Societies for Paint Technology, and on Jan. 14, 1970, in connection with the 1970 Winter Meeting of Committee D-1.

At the end of 1969 the voting membership of Committee D-1 numbered 379 and consisted of 224 producers, 86 consumers, and 69 general interest members. In addition to the voting members, about 200 more committee members participate in the work of the committee. Because of the apparent numerical preponderance of members now classified as producers, the Executive Committee is engaged in a study of a new classification system which will more accurately reflect the activities and interests of the Committee D-1 members.

Committee D-1 is privileged to have the advice and participation of 22 Honorary Members which includes A. J. Eickhoff who was elected to Honorary Membership on Jan. 14, 1970. At this same meeting, C. F. Pickett was also elected to Honorary Membership but we record with regret his death later in 1970.

At its two meetings Committee D-1 approved Memorial Resolutions in honor of six of its most active and respected members who had died in the last year: C. H. Adams, E. W. Boughton, R. H. Crossley, T. R. Donlan, W. J. Sweet, and S. Werthan.

It is with pride that Committee D-1 records the recognition accorded by the Society at its 1969 meeting, in presenting the

ASTM Award of Merit to Secretary W. A. Gloger. Mr. Gloger has served the Society in several capacities including a term as Director. His service with Committee D-1 has extended over almost 20 years including some 15 years as secretary.

During the year steps were taken to reactivate Subcommittee 56 on Printing Inks which is organizing itself to operate on a permanent basis. Also, Subcommittee 46 on Painting of Metals has decided to broaden its scope of responsibilities, as represented by its new title "Industrial Protective Painting."

At the June 1969 meeting, a paper on "Tests for Adhesion" was presented by E. M. Corcoran, Bell Telephone Laboratories. The speaker first defined adhesion and then described the various kinds of adhesion and indicated the specific parameters for some of the common tests for adhesion measurement. Slides were shown which illustrated the main features of the history of our work on tests for adhesion in Committee D-1. Pictures were shown of some of the instruments which had been included in round robins, and also summaries of the data obtained which had ultimately led to the present ASTM tests for adhesion.

During the 1970 Winter Meeting, a joint dinner meeting was held on Jan. 13 with the Cleveland Society for Paint Technology, the Cleveland Paint, Varnish and Lacquer Association, the Cleveland Section of the Construction Specifications Institute, and the Cleveland District of ASTM. After the dinner a panel of three speakers presented talks on the subject "High Performance Paints on Heavy Duty Sites." C. A. Bruno, of Oliver B. Cannon and Sons, Inc., Philadelphia, Pa., spoke from the point of view of the painting contractor. K. P. Karsten of the Powder and Pigments Finishes Div.,

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Alcoa Research Laboratories, New Kensington, Pa., discussed the subject from the point of view of a large industrial user of maintenance paints. G. J. W. Killip, of the architectural firm of Hoag, Wismar and Henderson, Cleveland, Ohio, discussed the subject from the viewpoint of the architect who is responsible for drafting specifications. The moderator was Dr. John C. Weaver, Vice-Chairman of Committee D-1 and a member of the Cleveland Society.

At its meeting on Sept. 9, 1969, the ASTM Board of Directors approved the establishment of the William T. Pearce Award under the sponsorship of Committee D-1. The Award, to be presented not more frequently than once a year to a member of Committee D-1 who has performed outstanding work and has had published a technical paper of merit relating to the science of testing paints and paint materials, honors Dr. William T. Pearce who was a member of Committee D-1 for 45 years and who served as its chairman for 20 years.

In September 1969, R. P. Bates was appointed to replace A. J. Eickhoff as chairman of Subcommittee 46 on Painting of Metals, and in February 1970, J. D. O'Connor was named to succeed J. P. McGuigan as chairman of Subcommittee 23 on Physical Properties of Paint Films.

The officers elected for the ensuing term of two years are as follows:

Chairman, J. C. Moore
Vice-Chairman, J. C. Weaver
Secretary, H. M. Werner

Also, the following were elected for six-year terms on the Executive Committee: H. M. Ammlung, M. J. Gavala, and J. Goldstein.

RECOMMENDATIONS ACCEPTED BY THE COMMITTEE ON STANDARDS

Subsequent to the 1969 annual report, Committee D-1 presented to the Society through the Committee on Standards the following recommendations, which became effective on the dates indicated:

Revision of Tentatives:

D 2379 - 69 T (formerly D 2379 - 65 T), Method of Test for Acidity of Formaldehyde Solutions (Subcommittee 35) (effective Sept. 19, 1969)

Revised to provide a more up-to-date statement of precision and the calculation and report sections which precede it.

D 2380 - 69 T (formerly D 2380 - 65 T), Method of Test for Methanol Content of Formaldehyde Solutions (Subcommittee 35) (effective Sept. 19, 1969)

Revised to provide an improved statement of the precision of the method.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee D-1 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which were accepted by the Society effective on the dates indicated:

New Standards:

D 2830 - 69, Method of Test for Durability and Compatibility of Factory-Primed Wood Products with Representative Finish Coats (Subcommittee 52) (effective Oct. 17, 1969)

This method is concerned with the performance of the primed surface in relation to the performance of a representative group of conventional finish coats when applied to the primed surface.

D 2831 - 69, Method of Test for Evaluating the Ability of a Latex Paint to Resist Efflorescence from Substrate (Subcommittee 42) (effective Oct. 17, 1969)

This method covers the determination of the degree to which an emulsion paint resists the formation of efflorescence on the exposed paint surface brought about by normal environmental conditions.

D 2832 - 69, Recommended Practices for Determining Nonvolatile Content of Paint and Paint Materials (Subcommittee 21) (effective Oct. 17, 1969)

These recommended practices cover the use of available ASTM methods for determining the nonvolatile content of paint raw materials, finished paints, varnishes, lacquers, and shellac; they are intended to serve

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as a guide to the selection of the proper existing ASTM designation for the material of interest.

- D 2833 - 69**, Index of Methods for Testing Architectural Paints and Coatings (Subcommittee 42) (effective Nov. 7, 1969)

This index is provided for reference in the selection of procedures, test methods, and specifications to be used in the evaluation of architectural paints and coatings designed for application in the field. Composition specifications and analytical methods in general, also tests on raw materials, are not included, the scope being limited to procedures required in the evaluation of finished coatings.

Revision of Standards:

- D 1209 - 69** (formerly D 1209 - 62), Method of Test for Color of Clear Liquids (Platinum-Cobalt Scale) (Subcommittee 35) (effective Oct. 17, 1969)

Revised to include improved statement of precision and two appendixes which present the data on which the precision statements are based.

- D 1296 - 69** (formerly D 1296 - 55), Method of Test for Residual Odor of Lacquer Solvents and Diluents (Subcommittee 35) (effective Oct. 17, 1969)

Revised to provide more detailed instructions and to differentiate between "characteristic" and "residual" odors.

- D 1617 - 69** (formerly D 1617 - 62), Method of Test for Ester Value of Lacquer Solvents and Thinners (Subcommittee 35) (effective Oct. 17, 1969)

Revised to improve report section and improve statement of precision.

- D 1738 - 69** (formerly D 1738 - 66), Method of Test for Hiding Power of Nonchromatic Paints (Subcommittee 26) (effective Oct. 17, 1969)

Revised to provide a more accurate statement of the requirements and limitations for the reflectometer to be used in the test.

Reapproval of Standards:

- D 81 - 43 (1969)**, Specification for Basic Carbonate White Lead
D 84 - 51 (1969), Specification for Red and Brown Iron Oxide Pigments
D 209 - 47 (1969), Specifications for Lamp-black
D 210 - 47 (1969), Specification for Bone Black
D 262 - 47 (1969), Specification for Ultramarine Blue
D 405 - 41 (1969), Specification for Blue Lead; Basic Sulfate
D 763 - 48 (1969), Specification for Raw and Burnt Umber
D 765 - 48 (1969), Specification for Raw and Burnt Sienna
D 768 - 47 (1969), Specification for Yellow Iron Oxide, Hydrated
D 769 - 48 (1969), Specification for Black Synthetic Iron Oxide

ACTIVITIES OF SUBCOMMITTEES

Division 10, Administrative

Subcommittee 5 on Intercommittee Relations (J. C. Weaver, chairman), has continued monitoring the activities of other committees in the Society for matters of interest to Committee D-1. Some two dozen items relating to work and progress or completed within the Society within the last year, were reported to the appropriate D-1 subcommittees.

Subcommittee 6, USA Committee for ISO/TC 35 and ISO/TC 50 (J. C. Weaver, chairman), received reports from two of its members, J. C. Weaver and H. K. Hammond, III, who had attended the Sixth Plenary Meeting of ISO/TC 35 on Paint and Paint Materials held in Dublin, Ireland, June 2 to 6, 1969. The subcommittee also received an invitation for ASTM to participate with Working Group E on Driers of ISO/TC 35.

Subcommittee 7 on Government Contact (GSA) (H. M. Werner, chairman), considered a number of recommendations presented by the U. S. Government Ad Hoc Committee on Federal Test Method Standard 141 and forwarded 11 of the major recommendations to the appropriate D-1 subcommittees for review and consideration.

Subcommittee 8.1, Joint-Federation

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ASTM Committee on Paint, Varnish and Lacquer (M. W. Westgate, chairman), reported that the Federation of Societies for Paint Technology had formally approved 23 additional ASTM standards as joint standards, and another 15 proposed joint standards were being voted upon.

Subcommittee 14 on Statistical Application (I. Nimeroff, chairman), is completing the work on Part C on Statistical Analysis, the final part of its Proposed Recommended Practice for Laboratory Testing of Paint and Related Materials. The subcommittee expects to present the complete Recommended Practice to Committee D-1 within the year.

Subcommittee 16 on Definitions (F. B. Stieg, Jr., chairman), has under consideration a proposed definition of "flocculation" and will consider the preparation of a definition for "seamless flooring" when additional necessary information has been obtained.

Subcommittee 19 on Gardner-Sward Handbook (A. G. Roberts, chairman), has obtained additional contributors for specific chapters of the Handbook and the Editor, G. G. Sward, has received more than half of the copy which will be included in the final book.

Division 20, Research and General Methods

Subcommittee 20 on Sampling (R. A. Brown, chairman), on the basis of a survey conducted to determine the methods of sampling presently in use by paint consumers, has drafted a Sampling Procedure for Liquid Pigmented Paints and Coatings. The draft, which follows Method 1021 of Federal Standard 141, is being reviewed by the subcommittee in preparation for submittal to letter ballot of Committee D-1.

Subcommittee 21 on Chemical Analysis of Paint and Paint Materials (W. H. Madson, chairman), is continuing its work on the determination of barium in low concentrations in paints and on the determination of solvent composition and identification of polymers in emulsion paints. It is going forward with its review and revision of Methods D 283, Chemical Analysis of Dry Cuprous Oxide and Copper Pigments, D 279, Test for Bleeding of Pigments and D 305, Test for Acetone Extract in Black Pigments.

Subcommittee 23 on Physical Properties of Paint Films (J. D. O'Connor, chairman),

has five active working groups. The adhesion group is evaluating various adhesion instruments and is gathering information on adhesion tests currently used in industry. The group on film thickness measurement has started collaborative measurements of relatively thick coatings over steel and is also engaged in the revision of Method D 1186, Measurement of Dry Film Thickness of Non-Magnetic Coatings of Paint, etc. Applied on a Magnetic Base, to include the General Electric Model B instrument. The group on hardness and mar resistance is working with scuff-type instruments and the group on fire retardants has collected all available data on the various revisions of the two foot tunnel test now in use. Impact instruments such as the falling ball impactier and the cupping test are being investigated by the group working on tensile strength and elongation.

Subcommittee 24 on Physical Properties of Liquid Paints and Paint Materials (M. P. Morse, chairman), is completing its work on the determination of flash point of viscous paint materials using the Tag Open Cup, Tag Closed Cup, and the Pensky-Marten Tester. Its group on fineness of dispersion is developing methods for measuring flocculation both in liquid paints and in dry films. Method D 1200, Test for Viscosity of Paints, Varnishes and Lacquers by Ford Viscosity Cup, is under revision in the group of rheological properties. The subcommittee has placed its group on pigment settling in an inactive status because of insufficient interest.

Subcommittee 26 on Optical Properties (H. K. Hammond, III, chairman), in its group on color measurement, is engaged in revising Method D 2244, Test for Instrumental Evaluation of Color Differences of Opaque Materials, and, in its group on gloss and goniphotometry, is revising Method D 1471, Test for Two Parameter, 60-deg Specular Gloss. In addition the group on hemispherical reflectance is conducting collaborative tests to measure a set of panels with Taylor-Baumgartner reflectometers. The subcommittee has also held a letter ballot on a proposed method of test for determination of pigment color by the use of a sand mill.

Subcommittee 27 on Accelerated Tests for Protective Coatings (W. B. Bartelt, chairman), is completing a round robin to test

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the operation of the XW Weather-Ometer without filters, using five different paint systems. A revision of Method D 870, Water Immersion Test of Organic Coatings on Steel, has been initiated. The subcommittee has also established a new working group to be concerned with coatings for exposure to nuclear radiation.

Subcommittee 28 on Biodeterioration (R. T. Ross, chairman), is balloting on proposed definitions for 13 terms relating to biodeterioration. It is going forward in its selection of photographs which will depict various degrees of fungus disfigurement of painted surfaces. Nine cooperators are evaluating an accelerated test method for measuring the fungus resistance of paint films. Three different paints have been placed on exterior exposure at eight geographical locations to determine differences in susceptibility to fungus disfigurement of painted surfaces exposed at different angles and directions.

Division 30, Paint Materials

Subcommittee 31 on Specifications for Pigments (P. Wheeler, chairman), in its group on metallic pigments, is considering a proposed method for the determination of water covering capacity, based on Draft Recommendation 1247 of the International Organization for Standardization. Work is continuing on a proposed method for determination of particle size distribution of white extender pigments and on a revision of Specifications D 1648 for Basic Lead Silico Chromate.

Subcommittee 32 on Drying Oils (E. C. Gallagher, chairman), has completed all of its active projects and is investigating new areas of activity.

Subcommittee 33 on Varnish and Resin, Including Shellac (H. M. Werner, chairman), has five active working groups one of which, on alkyds, is carrying out collaborative work to improve the precision on a proposed method for hydroxyl value of alkyds; this group has also started a round robin on a GLC method for the determination of dimer acid content of alkyds. Work in other groups is concerned with revision of Method D 1640, Tests for Drying, Curing, or Film Formation of Organic Coatings at Room Temperature, on the basis of recent work done by the Philadelphia Society for Paint

Technology, collaborative testing of a revised "area" method for the determination of solubility parameters, and obtaining additional exposure data on paints or enamels using tall oil fatty acid alkyds in comparison with alkyds based on soya, safflower, or linseed oil alkyds.

Subcommittee 35 on Solvents, Plasticizers, and Chemical Intermediates (S. A. Murray, chairman), has three active working groups. The major current activity of the first group is the determination of the aromatics content in mineral spirits. The second group is preparing specifications for nitropropane, determining the need for specifications on additional grades of esters, and the preparation of a precision statement for Method D 1353, Test for Nonvolatile Solvents for Use in Paint, Varnish, Lacquer and Related Products. The third group has organized task groups which are carrying forward their work on acrylates, acetaldehydes and pentaerythritol. In addition data have been collected from solvent producers concerned with atmospheric sampling and testing for solvents therein in preparation for turning the information over to Committee D-22 on Sampling and Analysis of Atmospheres.

Division 40, Paint Products Applied on Site

Subcommittee 42 on Architectural Paints (S. B. Levinson, chairman), is completing its work on the proposed recommended practices for testing interior alkyd flats in preparation for transmittal to subcommittee letter ballot. Its work on the brushability method has shown promise but efforts are continuing to improve the precision of the proposed method. Work is going forward on a method for evaluating ease of removal of stains from paint films, on evaluating the leveling properties of paints, on a method for rating the porosity of paint films, and on a procedure for evaluating color compatibility of both solvent-type and water-base paints. Its groups on Government specifications is engaged in reviewing major Federal specifications in an effort to bring them up-to-date with actual industry practice and, eventually, to develop industry standards from them.

Subcommittee 44 on Traffic Paints (F. G. Smith, chairman), has established a task group to cooperate directly with Subcommittee 3C on Highway Traffic Marking Ma-

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materials on Committee D-4 on Road and Paving Materials. Its other three active working groups are engaged in the revision of Method D 969, Laboratory Test for Degree of Resistance of Traffic Paint to Bleeding, the review of current specifications for the glass beads used in traffic paints, and on an accelerated method to evaluate the settling properties of traffic paints during storage.

Subcommittee 45 on Marine Coatings (J. R. Saroyan and W. H. Briggs, co-chairmen), in its working group on deep submergence, will solicit suggestions from companies interested in deep submergence performance as to test methods needed. The group concerned with shallow submergence has agreed that a test method for fresh water as well as for sea water should be developed. The intermittent submergence group also has decided that test methods for fresh water and for salt water should be developed and will first investigate methods and procedures now being used by industry and commercial testing companies. A composite test method for marine atmospheric exposure is the objective of the group working on atmospheric exposure which is collecting methods and procedures now in use by industry and commercial testing companies. The group on panel design and preparation is compiling practices now in use and will also include suggestions for improvements which may be offered by members and interested testing activities.

Subcommittee 46 on Industrial Protective Painting (R. P. Bates, chairman), formerly known as the Subcommittee on Painting of Metals, is reorganizing itself to broaden its scope in keeping with its new title. Its two present working groups will continue all their original assignments. The group on pictorial surface preparation standards is bringing to a conclusion its proposed revision in the format of Method D 610, Evaluating Degree of Resistance to Rusting Obtained with Paint on Iron or Steel Surfaces. The other groups, on highway painting problems, has completed its task of preparing a proposed guide for painting inspectors which now is ready for subcommittee letter ballot. A task force was named to review Method D 1014, Conducting Exterior Exposure Tests of Paints on Steel.

Subcommittee 47 on Seamless Flooring (R. A. Bieneman, chairman), has five active

working groups. The group on reproducible test panel lay up methods has drafted a method which will be submitted to the chairmen of the subcommittee's other groups for their use in preparing test panels for particular tests; the draft method will be revised in accordance with the experience gained with it. The group on appearance has examined a number of panels which showed the types of color which developed by seamless systems on exterior exposure; a number of different color measuring instruments will be used to read the changes in color and gloss values which will be obtained at the same time. The group on resistance to chemicals and solvents has organized a round robin to evaluate available ASTM and Federal specification test procedures. The group on physical properties is directing its attention to "loss of gloss" abrasion methods and has planned a cooperative program to evaluate at least three available commercial instruments.

Subcommittee 48 on Tile-Like Coatings (R. M. Evans, chairman), has two working groups: on adhesion and on appearance. The adhesion group has finished a study of the Elcometer as an on-the-job adhesion tester and will prepare a technical paper suitable for publication covering its work. The group has also requested that the manufacturers of the Elcometer make available a motorized version which can be electrically operated and would also be suitable for battery operation for field testing. The group on appearance has completed its work on the evaluation of a synthetic perspiration described in a Federal specification and a scrub test which is intended to distinguish between conventional coatings and tile-like finishes. The subcommittee is continuing its close cooperation with the General Services Administration in evaluating Federal specifications of interest to it.

Division 50, Paints for Factory Application

Subcommittee 52 on Factory-Coated Wood Products (R. A. Holcombe, chairman), has a working group on permeability which is examining Method D 2045, Test for Water Absorptiveness of Nonbibulous Paper and Paper Board (Cobb Test), which is under the jurisdiction of Committee D-6 on Paper and Paper Products, for possible modification and use for determining the permeability of

REPORT OF COMMITTEE D-1

coating systems applied to wood and wood-based products. The subcommittee will ballot on a proposed recommended practice for determining the temperature of applied coatings on wood products during the curing cycle, which was prepared by the group on paint properties. The group on hardboard plans a round robin on methods for the accelerated testing of coated hardboards. The subcommittee's three other active groups are working on film thickness, moisture blister resistance, and on tests for water repellents and preservatives.

Subcommittee 53 on Factory-Coated Strip Metal (E. A. Stockbower, chairman), continues, in its group on formability, to work on a test method for vise-bend and wedge-bend. The group working on cure is investigating the pencil test, the solvent rub test, and the Meseran evaporative rate technique, and has recommended that its work on the pencil test be published for information purposes. The third working group has completed its work and will offer for a subcommittee letter ballot its proposed test method for measuring pressure mottling.

Subcommittee 55 on Factory-Applied Coatings on Preformed Products (N. I. Gaynes, chairman), has three active working groups and a special task force. The subcommittee will ballot on the proposed recommended practice for determining the stain resistance of factory-applied coatings on wood products which was prepared by the group on coatings for wood products. The

group on metal coatings is continuing its work on a method for the use of the gravelometer and on a method for evaluating acid- and mortar-resistance coatings for extruded aluminum. The coatings for plastics group, to resolve negative votes received in a recent subcommittee letter ballot, has made editorial and procedural changes in its proposed recommended practices for the evaluation of coatings on plastic and the new draft will be resubmitted to subcommittee ballot. The special task force is completing its work on a proposed instrumental method for the quantitative determination of nitrocellulose in lacquer.

Subcommittee 56 on Printing Inks (I. C. White, chairman pro tem), is in the process of reorganization and reactivation under its temporary chairman. It has drafted and recommended the following as its statement of scope:

"Test methods, nomenclature, definitions, recommended practices, instrumental standards, and specifications for: (1) printing inks; (2) components thereof; and (3) ink/substrate systems. These activities will be coordinated with those of other relevant committees of ASTM and of other organizations."

Respectfully submitted on behalf of the committee,

J. C. MOORE,
Chairman

W. A. GLOGER,
Secretary

REPORT OF COMMITTEE

D-2 ON PETROLEUM PRODUCTS AND LUBRICANTS

Some highlights of the activity of Committee D-2 on Petroleum Products and Lubricants during the period June 1969 to June 1970 are covered in this report. The newly elected officers for the period 1970 to 1972 are:

Chairman, L. B. Sargent, Jr.
First Vice-Chairman, W. E. Chalfant
Second Vice-Chairman, C. C. Ward
Secretary, R. R. Wright

New Classification System for Lubricants:

Eight new classifications for motor oils have been approved by ASTM, SAE, and API. The purpose of the new system is to promote better communication between engine oil user, engine oil supplier, and engine manufacturer. The eight classes are correlated to ASTM performance levels and will replace the five current API designations—MS (Motor Severe), MM (Motor Moderate), DS (Diesel Severe), DM (Diesel Moderate), and DG (Diesel General). In the new system, oils are separated into two groups—one (designated "S") is for passenger cars and light trucks is of concern to service stations, garages, and new car dealers; the other (designated "C") is for heavier vehicles operated by fleet owners, contractors, farmers, and stationary power plants and other consumers.

The committee will hold its next meeting on Dec. 6-11, 1970, at the Sheraton-Dallas Hotel in Dallas, Tex.

International Standardization:

Coordination with the Institute of Petroleum of proposals for new methods or approvals of existing methods as Joint ASTM-IP Standards is proceeding. In September 1969, ISO/TC 28 on Petroleum Products adopted a program whereby some 30 existing national standards for testing

petroleum will be considered as international recommendations during the next several years. Of the following 30 standards, all but two are American National Standards promulgated by ASTM.

Color of Petroleum Products

Copper Corrosion by Petroleum Products—Copper Strip Test Sulfur in Petroleum Products and Liquefied Petroleum (LP) Gases (Lamp Method)

Dropping Point of Lubricating Grease

Congealing Point of Petroleum Waxes Including Petrolatum

Cone Penetration of Lubricating Grease

Lead in Gasoline—Volumetric Chromate Method

Distillation of Petroleum Products

Oil Content of Petroleum Waxes

Vapor Pressure of Liquefied Petroleum (LP) Gases

Sampling Liquefied Petroleum (LP) Gases

Viscosity, Kinematic

Kinematic Glass Viscometers

Sulfated Ash

Flash Point by Pensky-Martens Closed Tester

Freezing Point of Aviation Fuels

Mercaptans in Aviation Fuels

Penetration of Bituminous Materials

Estimation of Net Heat of Combustion of Aviation Fuels

Aniline Point

Melting Point of Petroleum Wax (Cooling Curve)

Softening Point of Asphalt (Bitumen)

Smoke Point of Aviation Fuels

Viscosity Index

Octane Rating of Motor Fuels by Motor and Research Methods

Pour Point

Cloud Point

Flash Point

Flash Point (Cleveland Open Cup)

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Vapor Pressure (Reid Method)

The program of future work of ISO/TC 28 in the areas of methods of test includes improved methods for determination of neutralization number; lead alkyls in gasoline; and sulfur in petroleum products.

RECOMMENDATIONS ACCEPTED BY THE COMMITTEE ON STANDARDS

Subsequent to the 1969 annual report, Committee D-2 presented to the Society through the Committee on Standards the following recommendations, which were accepted effective on July 24, 1970:

New Tentatives:

- D 2880 - 70 T**, Gas Turbine Fuel Oils (Tech. Div. E-III)
- D 2881 - 70 T**, Metal Working Fluids and Related Materials (Tech. Div. L-I)
- D 2882 - 70 T**, High Pressure Pump Testing of Hydraulic Oils (Tech. Div. NVII)
- D 2883 - 70 T**, Reaction Threshold Temperature of Liquid and Solid Materials (Tech. Div. O)
- D 2884 - 70 T**, Yield Stress of Heterogeneous Propellants by the Cone Penetration Method (Tech. Div. O)
- D 2885 - 70 T**, Determining Research and Motor Octane Ratings Using On-Line Analyzers (RDD I)
- D 2886 - 70 T**, Knock Characteristics of Motor Fuels by the Distribution Octane Number (DON) Method (RDD I)
- D 2887 - 70 T**, Boiling Range Distribution of Petroleum Fractions by Gas Chromatography (RDD IV-L)
- D 2888 - 70 T**, Analysis of Liquefied Petroleum Gases (LPG) by Process Gas Chromatography (Tech. Div. H-II and RDD IV-L)
- D 2889 - 70 T**, Calculation of True Vapor Pressures of Petroleum Distillate Fuels (RDD IV-k)
- D 2890 - 70 T**, Calculation of Liquid Heat Capacity of Petroleum Distillate Fuels (RDD IV-k)
- D 2891 - 70 T**, Validation of Results of Process Distillation Analyzers (RDD VIII-A)
- D 2892 - 70 T**, Distillation of Crude Petroleum (RDD VIII-C)
- D 2893 - 70 T**, Oxidation Characteristics of

Extreme Pressure Oils (Tech. Div. L and RDD IX-B)

- D 2894 - 70 T**, Analysis of Calcium and Barium Petroleum Sulfonates by Liquid Chromatography (Subc. XXIV)
- D 2895 - 70 T**, Gloss Retention of Waxed Paper and Paperboard After Storage at 104 F (40 C) (Tech. Div. M-III)
- D 2896 - 70 T**, Total Base Number of Petroleum Products by Potentiometric Perchloric Acid Titration (RDD VI-A)

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee D-2 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which were accepted by the Society effective on Oct. 2, 1970:

New Standards:

- D 2877 - 70**, Measuring Frictional Properties of Slideway Lubricants (Tech. Div. L-XI)
- D 2878 - 70**, Estimating Apparent Vapor Pressures and Molecular Weights of Lubricating Oils (Tech. Div. O)
- D 2879 - 70**, Vapor Pressure—Temperature Relationship and Initial Decomposition Temperature of Liquids by Isoteniscope (Tech. Div. O)

Adoption of Tentatives as Standard Without Revision:

- D 1266 - 70** (formerly D 1266 - 69 T), Sulfur in Petroleum Products (Lamp Method) (RDD III-A)
- D 2006 - 70** (formerly D 2006 - 65 T), Characteristic Groups in Rubber Extender and Processing Oils by the Precipitation Method (Tech. Div. R)
- D 2226 - 70** (formerly D 2226 - 67 T), Recommended Practice for Description of Types of Petroleum Extender Oils (Tech. Div. R)
- D 2274 - 70** (formerly D 2274 - 66 T), Stability of Distillate Fuel Oil (Accelerated Method) (RDD IX-A)
- D 2423 - 70** (formerly D 2423 - 65 T), Weight of Surface Wax on Waxed Paper (Tech. Div. M-III)

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- D 2595 - 70** (formerly D 2595 - 67 T), Evaporation Loss of Lubricating Greases over Wide-Temperature Range (Tech. Div. G-III)
- D 2599 - 70** (formerly D 2599 - 67 T), Lead in Gasoline by X-Ray Spectrometry (RDD III-B)
- D 2603 - 70** (formerly D 2603 - 67 T), Sonic Shear Stability of Polymer-Containing Oils (RDD VII-B)
- D 2618 - 70** (formerly D 2618 - 67 T), Pressure Blocking Point of Petroleum Wax and Wax Blends (Tech. Div. M-III)
- D 2649 - 70** (formerly D 2649 - 67 T), Determining Corrosion Characteristics of Dry Solid Film Lubricants (Tech. Div. O)
- D 2713 - 70** (formerly D 2713 - 68 T), Dryness of Propane (Valve Freeze Method) (Tech. Div. H-II)
- D 2784 - 70** (formerly D 2784 - 69 T), Sulfur in Liquefied Petroleum Gases (Oxy-Hydrogen Burner or Lamp) (RDD III-A)
- D 2785 - 70** (formerly D 2785 - 69 T), Trace Quantities of Total Sulfur (Oxy-Hydrogen Combustion Method) (RDD III-A)
- Adoption of Tentatives as Standard With Revision:*
- D 1439 - 70** (formerly D 439 - 69 T), Spec. for Gasoline (Tech. Div. A-I)
- D 1748 - 70** (formerly D 1748 - 62 T), Test for Rust Protection by Metal Preservatives in the Humidity Cabinet (RDD X-B)
- D 2593 - 70** (formerly D 2593 - 57 T), Test for Butadiene Purity and Hydrocarbon Impurities by Gas Chromatography (Tech. Div. D-I)
- D 2712 - 70** (formerly D 2712 - 68 T), Test for Hydrocarbon Traces in Propylene Concentrates by Gas Chromatography (Tech. Div. D-I)
- Revision of Standards:*
- D 56 - 70** (formerly D 56 - 64 (1968)), Test for Flash Point by Tag Closed Tester (RDD VIII-B)
- D 95 - 70** (formerly D 95 - 62 (1968)), Test for Water in Petroleum Products and Bituminous Materials (RDD V-A)
- D 381 - 70** (formerly D 381 - 64 (1968)), Test for Existent Gum in Fuels by Jet Evaporation (RDD IX-A)
- D 526 - 70** (formerly D 526 - 66), Test for Lead in Gasoline, Gravimetric Method (RDD III-B)
- D 910 - 70** (formerly D 910 - 68), Spec. for Aviation Gasoline (Tech. Div. J-I)
- D 938 - 70** (formerly D 938 - 60 (1968)), Test for Congealing Point of Petroleum Waxes, Including Petrolatum (Tech. Div. M-I)
- D 1015 - 70** (formerly D 1015 - 55 (1968)), Test for Freezing Points of High-Purity Hydrocarbons (RDD IV-D)
- D 1216 - 70** (formerly D 1216 - 56 (1968)), Analysis of Calcium and Barium Petroleum Sulfonates (Subcomm. XXIV)
- D 1319 - 70** (formerly D 1319 - 69), Test for Hydrocarbon Types in Liquid Petroleum Products by Fluorescent Indicator Adsorption (RDD IV-C)
- D 1321 - 70** (formerly D 1321 - 65), Test for Needle Penetration of Petroleum Waxes (Tech. Div. M-I)
- D 1655 - 70** (formerly D 1655 - 69), Spec. for Aviation Turbine Fuels (Tech. Div. J-I)
- D 1660 - 70** (formerly D 1660 - 69), Test for Thermal Stability of Aviation Turbine Fuels (Tech. Div. J-VIII)
- D 2163 - 70** (formerly D 2163 - 66), Analysis of Liquefied Petroleum (LP) Gases and Propylene Concentrates by Gas Chromatography (Tech. Div. D-I and Tech. Div. H-II)
- D 2276 - 70** (formerly D 2276 - 69), Test for Particulate Contaminant in Aviation Turbine Fuels (Tech. Div. J-X)
- D 2547 - 70** (formerly D 2547 - 67), Test for Lead in Gasoline, Volumetric Chromate Method (RDD III-B)
- D 2699 - 70** (formerly D 2699 - 68), Test for Knock Characteristics of Motor Fuels by the Research Method (RDDI)
- D 2700 - 70** (formerly D 2700 - 68), Test for Knock Characteristics of Motor and Aviation-Type Fuels by the Motor Method (RDDI)
- Intention to Withdraw Standards:*
- D 88 - 56 (1968)**, Saybolt Viscosity (RDD VII-A)
- D 614 - 67**, Knock Characteristics of Aviation Fuels by the Aviation Method (RDDI)

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AMERICAN NATIONAL STANDARDS

The following new ASTM Standards were recommended to ANSI Standards Committee Z11 on Petroleum Products and Lubricants for submittal to the American National Standards Institute, Inc. (ANSI) for approval as American National Standards:

- D 439 - 69 T**, Spec. for Gasoline (Tech. Div. A-I)
- D 613 - 65**, Test for Ignition Quality of Diesel Fuels by the Cetane Method (RDD I)
- D 1319 - 69**, Test for Hydrocarbon Types in Liquid Petroleum Products by Fluorescent Indicator Adsorption (RDD IV-C)
- D 1465 - 65**, Test for Blocking Point of Petroleum Wax (Tech. Div. M-III)
- D 1748 - 62 T**, Test for Rust Protection by Metal Preservatives in the Humidity Cabinet (RDD X-B)
- D 2004 - 65**, Test for Modulus of Rupture of Petroleum Wax (Tech. Div. M-I)
- D 2163 - 66**, Analysis of Liquefied Petroleum (LP) Gases and Propylene Concentrates by Gas Chromatography (Tech. Div. D-I and Tech. Div. H-II)
- D 2276 - 69**, Test for Particulate Contaminant in Aviation Turbine Fuels (Tech. Div. J-X)
- D 2392 - 65**, Test for Color of Dyed Aviation Gasolines (RDDV-C)
- D 2423 - 65 T**, Test for Weight of Surface Wax on Waxed Paper (Tech. Div. M-III)
- D 2593 - 67 T**, Test for Butadiene Purity and Hydrocarbon Impurities by Gas Chromatography (Tech. Div. D-I)
- D 2595 - 67 T**, Test for Evaporation Loss of Lubricating Greases over Wide-Temperature Range (Tech. Div. G-III)
- D 2599 - 67 T**, Test for Lead in Gasoline by X-Ray Spectrometry (RDD III-B)
- D 2603 - 67 T**, Test for Sonic Shear Stability of Polymer-Containing Oils (RDD VII-B)
- D 2618 - 67 T**, Test for Pressure Blocking Point of Petroleum Wax and Wax Blends (Tech. Div. M-III)
- D 2649 - 67 T**, Determining Corrosion Characteristics of Dry Solid Film Lubricants (Tech. Div. O)
- D 2712 - 68 T**, Test for Hydrocarbon Traces in Propylene Concentrates by Gas Chromatography (Tech. Div. D-I)
- D 2713 - 68 T**, Test for Dryness of Propane

(Valve Freeze Method) (Tech. Div. H-II)

- D 2784 - 69 T**, Test for Sulfur in Liquefied Petroleum Gases (Oxy-Hydrogen Burner or Lamp) (RDD III-A)
- D 2785 - 69 T**, Test for Trace Quantities of Total Sulfur (Oxy-Hydrogen Combustion Method) (RDD III-A)

The following American National Standards were recommended to ANSI Standards Committee Z11 on Petroleum Products and Lubricants for submittal to the American National Standards Institute, Inc. (ANSI) for reapproval as American National Standards: Z11.9-1962, Test for Water in Petroleum and Other Bituminous Materials (D 95)

- Z11.24-1964, Test for Flash Point by Tag Closed Tester (D 56)
- Z11.36-1961, Test for Existent Gum in Fuels by Jet Evaporation (D 381)
- Z11.48-1968, Test for Lead in Gasoline, Gravimetric Method (D 526)
- Z11.61-1960, Test for Congealing Point of Petroleum Waxes, Including Petrolatum (D 938)
- Z11.88-1960, Test for Freezing Points of High-Purity Hydrocarbons (D 1015)
- Z11.103-1960, Analysis of Calcium and Barium Petroleum Sulfonates (D 1216)
- Z11.108-1969, Test for Sulfur in Petroleum Products (Lamp Method) (D 1266)
- Z11.148-1968, Test for Thermal Stability of Aviation Turbine Fuels (D 1660)
- Z11.173-1965, Test for Needle Penetration of Petroleum Waxes (D 1321)
- Z11.188-1969, Spec. for Aviation Gaslines (D 910)
- Z11.204-1969, Spec. for Aviation Turbine Fuels (D 1655)
- Z11.223-1968, Test for Lead in Gasoline, Volumetric Chromate Method (D 2547)
- Z11.245-1969, Test for Knock Characteristics of Motor Fuels by the Research Method (D 2699)
- Z11.246-1969, Test for Knock Characteristics of Motor and Aviation-Type Fuels by the Motor Method (D 2700)

ACTIVITIES OF SUBDIVISIONS

A Symposium on the Effects of Automotive Emission Requirements on Gasoline Characteristics, was presented at the meeting in Toronto in June 1970. The symposium committee consisted of H. T. Niles, chair-

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man, Ford Motor Co.; J. B. Rather, Jr., Mobil Oil Corp.; and J. E. Sigsby, Jr., National Air Pollution Control Administration.

Research and Development Divisions

Division I on Combustion Characteristics (W. F. Ritcheske, Chairman)—reported that problems in casting cylinders of the ASTM knock test engines may force ASTM to adopt a different cylinder design with a resulting difference in the relationship between ASTM knock test reference fuels and the octane ratings of commercial gasolines.

Division III on Elemental Analysis (R. O. Clark, Chairman) reported that activity continues in the areas of methods for sulfur and antiknock compounds. After many years of work, a tentative method for determining salt in crude oil will be available for consideration at the December meeting. Precision sections will be added to the new methods for trace metals in gas turbine fuels.

Division IV on Hydrocarbon Analysis (J. F. Hickerson, chairman) is working on a boiling-range distribution method which will be extended to cover gasoline. Methods to analyze shale oil naphtha fractions will be extended to handle higher boiling hydrocarbons from shale. A full-day symposium is being prepared by Division IV for presentation at the December 1970 D-2 meeting which will stress how to use modern analytical information to better characterize petroleum products with less testing and costs.

Division V on Physical Analysis of Fuels and Light Distillates (E. T. Scafe, chairman) is working on improvements in ASTM Method D 240, Test for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter. This work is being coordinated with similar work in the IP: methods for water and sediment in gasoline, an improved method to predict the carbon forming tendencies of diesel fuel, and a method for acidity of aviation-turbine fuel residue. ASTM Standard Specifications D 439 - 70, for Gasoline were approved on July 15, 1970. These specifications are compatible with VV-G-76b, Automotive Gasoline. Work continues on the development of an improved method (D 240) for thermal value of fuel oils. In addition, Division V will continue its program to extend methods for

estimating thermal values of fuel to distillate and residual fuels.

Division VI on Analysis of Lubricants (G. J. Benoit, chairman) is working on an improved procedure for the determination of base number of lubricants. The current ASTM Standard D 664, Test for Neutralization Number by Potentiometric Titration, has been criticized for its inability to determine the base number of some lubricant formulations. The division also is working on a "quick" method for estimating anti-freeze content of used lubricating oils. Attempts to develop a similar test for diesel fuel diluent of crankcase lubricants have not been successful. None of the approaches tried have been sufficiently accurate.

Division VII on Flow Properties (W. A. Wright, Chairman) recommended that ASTM Method D 88, Test for Saybolt Viscosity, be withdrawn under the following suggested conditions: (a) withdrawal shall not take place until 1973, (b) that Committee D-4 on Road and Paving Materials take up the responsibility for maintaining the method, and (c) that between now and 1973 Committee D-2 and Committee D-4 undertake to cosponsor the method. A panel discussion on the biodegradability of compounded industrial lubricants will be organized for the December 1970 meeting in Dallas, Texas. The division is also working on shear stability of motor oils, low-temperature flow properties of gear oils and engine oils, the expansion of the viscosity pressure charts to lower and higher temperatures, and the development of a test for temperature of wax appearance in fuels.

Technical Divisions

Division C on Turbine Oils (F. K. Fischer, chairman) reported that the following two recommended practices had been published by The American Society of Mechanical Engineers.

ASME Standard No. 115D, Recommended Practices for the Design of Lubricating Systems for Marine Steam Turbine Pumps for Various Ship Services.

ASME Standard No. 121, Recommended Practices for the Purification of Lubricating Oil in Marine Steam Turbine Driven Auxiliary Machinery.

Similar publications are being readied to

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provide information for users of gas turbine and auxiliary equipment in central station and marine application. An informal symposium will be presented in June 1971 on the effects of aeration on the properties of turbine oils.

Division D on Hydrocarbons for Chemical and Special Uses (T. A. McKenna, chairman) is studying specifications for propylene. The Study Group on Stoddard Solvent has accumulated data and comments which may result in a proposal to specify four types of drycleaning solvents. One of the four types will be the traditional Stoddard solvent.

The meeting of *Division E on Burner and Diesel Fuel Oils* (J. H. King, chairman) in Houston, Texas, December 1969, featured a presentation, by G. V. Dyroff, of information included in the report "An Evaluation of Methods for Determination of Sulfur in Fuel Oils," by G. V. Dyroff and A. R. Crawford. The report shows the relationship between the precision of tests for sulfur in fuel oils and the level of sulfur that has to be maintained by the manufacturer for shipment or maintained by the customer for acceptance in order to meet a specification limit. Copies are available from American Petroleum Institute, 1801 K St. NW, Washington, D. C. 20006, at a price of \$1.50 per copy.

Section I on Specifications for Burner Fuel Oils has recommended that a proposed specification pattern for low-sulfur residual fuel oils be published, for information only, by ASTM as soon as possible. The critical demands on low-sulfur energy sources and the lack of alternative sources, such as atomic power and natural gas, are creating a need for a flexible specification for low-sulfur burning oils. The proposed new pattern will be a departure from the usual specification in that the supplier will inform the customer of fuel properties for each shipment.

Field experience with cold weather diesel truck operation has resulted in the conclusion, by Section II of Division E, that the pour point of diesel fuels should not be higher than 10 F above expected ambient operating temperatures.

Division G on Lubricating Grease (J. S. Aarons, chairman) is active in several areas of grease testing including: determination of

apparent viscosity at low shear rates, improved tests for water resistance and high-temperature performance, better procedures for ball joint greases, and improvements in the rust preventive characteristics.

Division H on Liquefied Petroleum Gas (C. W. Ricker, Jr., Chairman) is looking at improved methods for vapor pressure in LPG and refinements in ASTM Method D 2713, Test for Dryness of Propane (Valve Freeze Method).

Division J on Aviation Fuels (W. D. Sherwood, chairman) recommended revisions in turbine fuel specifications, D 1656, to include new additives. Also, important changes have been made in ASTM Method D 1660, Test for Thermal Stability of Aviation Turbine Fuels, and ASTM Method D 2276, Tests for Particulate Contaminant in Aviation Turbine Fuels.

Division L on the ASTM-ASLE Committee on Industrial Lubricants (J. T. Bunting, chairman)—A new tentative for oxidation characteristics of extreme pressure oil has been recommended. The committee is working on methods of tests to characterize penetrating oils and ways to measure air entrainment.

Division M, TAPPI-ASTM Committee on Petroleum Wax has had an active year, and is currently working on tests for determination of viscosity for wax-polymer blends, methods for oil content of oily waxes, methods for testing wax corrugated board, improved scuff methods, and several analytical methods for the wax itself.

Division N on Hydraulic Fluids (J. D. Lykins, chairman) held an informal symposium in Toronto, Canada, June 1970, on hydraulic system cleanliness requirements.

The National Bureau of Standards is being requested to consider supplying standard reference clays for use in ASTM Method D 2007, Test for Characteristic Groups in Rubber Extender and Processing Oil by the Clay-Gel Adsorption Chromatographic Method.

Respectfully submitted on behalf of the committee,

L. B. SARGENT, JR.,
Chairman

R. R. WRIGHT
Secretary

REPORT OF COMMITTEE D-3 ON GASEOUS FUELS

The Advisory Committee of Committee D-3 on Gaseous Fuel, met in Atlantic City, N. J., on June 24, 1969. Subcommittee V met in Cincinnati, Ohio, on Dec. 10, 1969.

Committee D-3 consists of 24 voting members, of whom 12 are classified as producers, 4 as consumers, and 8 as general interest members. There are 18 consulting members.

R. W. Davis was appointed chairman of Subcommittee II.

The following officers were elected by letter ballot for the period ending June 30, 1972:

Chairman, D. V. Kniebes
Vice-Chairman, J. W. Pierce
Secretary, K. R. Knapp
Assistant Secretary, J. C. Griffiths

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee D-3 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which were accepted by the Society effective on the dates indicated:

Adoption of Tentative as Standard Without Revision:

D 2725 - 70 (formerly D 2725 - 68 T), Test for Hydrogen Sulfide in Natural Gas (Methylene Blue Method) (Subcommittee V) (effective July 15, 1970)

Reapproval of Standards:

D 900 - 55 (1970), Method of Test for Colorific Value of Gaseous Fuels by the Water Flow Calorimeter

D 1071 - 55 (1970), Methods for Measurement of Gaseous Fuel Samples

D 1072 - 56 (1970), Methods of Test for Total Sulfur in Fuel Gases

D 1136 - 53 (1970), Method for Analysis of

Natural Gases by the Volumetric-Chemical Method

D 1137 - 53 (1970), Method for Analysis of Natural Gases and Related Types of Gaseous Mixtures by the Mass Spectroscope

D 1142 - 63 (1970), Method of Test for Water Vapor Content of Gaseous Fuels by Measurement of Dew-Point Temperatures

D 1145 - 53 (1970), Method of Sampling Natural Gas

D 1247 - 54 (1970), Method of Sampling Manufactured Gas

D 1826 - 64 (1970), Method of Test for Calorific Value of Gases in Natural Gas Range by Continuous Recording Calorimeter

ACTIVITIES OF SUBCOMMITTEES

Subcommittee III on Determination of Colorific Value of Gaseous Fuels (D. L. White, chairman) plans to initiate revisions of the methods under its supervision to incorporate new standard units. A meeting for the purpose is proposed at the first opportunity.

Subcommittee V on Determination of Special Constituents of Gaseous Fuels (D. F. Cundari, chairman) reviewed at its December meeting results of analysis by several co-operating laboratories of distributed samples of natural gas with a small total sulfur content. From the data now available, a method for determination of small quantities of total sulfur in natural gas is in preparation and should be available soon for committee consideration.

Respectfully submitted on behalf of the committee,

D. V. Kniebes,
Chairman

K. R. Knapp,
Secretary

REPORT OF COMMITTEE D-4 ON ROAD AND PAVING MATERIALS

Committee D-4 on Road and Paving Materials and its subcommittees held two meetings during the year: on June 27, 1969, during the Annual Meeting of the Society in Atlantic City, N. J., and on Dec. 10, 1969, in Cincinnati, Ohio.

The total number of members lost during the year was 22 and the total new or reinstated members was 28. The total number of voting members as of the date of this report is 201, with 90 producers, 49 consumers, and 62 general interest members. There are 16 honorary members of whom two are voting members.

The committee sponsored an informal session on Skid Resistance of Payments at the 1969 Annual Meeting.

The death of Herbert Spencer on March 7, 1969, and John Eugene Thompson on March 18, 1969, was recorded and memorial resolutions prepared and presented to the committee and to the respective families. Norman G. Smith died on Jan. 1, 1970, and a resolution is being prepared.

Woodrow J. Halstead received the Award of Merit in 1969.

New subcommittee chairmen appointed were: R. N. Simberg to replace K. E. Ellison in Subcommittee 2d; C. W. Chaffin to replace J. E. Thompson in Subcommittee 2e; N. L. Smith, Jr. to replace C. M. Hewett in Subcommittee 2f; V. P. Puzinauskas to replace C. H. Bascom in Subcommittee 4g; and F. P. Nichols, Jr. to replace J. E. Gray in Subcommittee 5b.

RECOMMENDATIONS ACCEPTED BY THE COMMITTEE ON STANDARDS

Subsequent to the 1969 annual report, Committee D-4 presented to the Society through the Committee on Standards the following recommendation which was accepted effective on Sept. 19, 1969:

New Tentative:

D 2835 - 69 T, Specification for Lubricant

for Installation of Preformed Compression Seals in Concrete Pavements (Subcommittee 3e)

In the use of preformed elastomeric compression seals in prepared contraction joints in concrete pavements it has been found very helpful in the installation to use a lubricant.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee D-4 submitted the following recommendations to the Society under the Interim Procedure for Standards, which were accepted by the Society effective on the dates indicated:

New Standard:

D 2872 - 70, Test for Effect of Heat and Air on a Moving Film of Asphalt (Rolling Thin-Film Oven Test) (Subcommittee 4g) (effective June 12, 1970)

This method fills a need to measure the effect of heat and air on a moving film of semi-solid asphaltic material.

Adoption of Tentative as Standard Without Revision:

D 1854 - 69 (formerly D 1854 - 61 T), Specification for Jet-Fuel-Resistant Concrete Joint, Sealers, Hot-Poured Elastic Type (Subcommittee 3d) (effective Nov. 14, 1969)

D 1855 - 69 (formerly D 1855 - 61 T), Testing Jet-Fuel-Resistant Concrete Joint Sealer, Hot-Poured Elastic Type (Subcommittee 3d) (effective Nov. 14, 1969)

D 2397 - 69 (formerly D 2397 - 69 T), Specification for Cationic Emulsified Asphalt (Subcommittee 4b) (effective Nov. 14, 1969)

D 2629 - 69 (formerly D 2629 - 67 T), Specifications for Hot-Mixed, Hot-Laid Emul-

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sified Asphalt Paving Mixtures (Subcommittee 2d) (effective Nov. 14, 1969)

Adoption of Tentative as Standard with Revision:

D 140 - 70 (formerly D 140 - 69 T), Sampling Bituminous Materials (Subcommittee 3a) (effective Feb. 27, 1970)

D 2628 - 69 (formerly D 2628 - 67 T), Specification for Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements (Subcommittee 3e) (effective Nov. 14, 1969)

Revision of Standards:

D 8 - 70 (formerly D 8 - 68), Definitions of Terms Relating to Materials for Roads and Pavements (Subcommittee 1b) (effective June 25, 1970)

D 70 - 70 (formerly D 70 - 52), Test for Specific Gravity of Semi-Solid Bituminous Materials (Subcommittee 4h) (effective June 25, 1970)

D 242 - 70 (formerly D 242 - 64), Specifications for Mineral Filler for Bituminous Paving Mixtures (Subcommittee 5a) (effective June 12, 1970)

D 517 - 70 (formerly D 517 - 50), Specifications for Asphalt Plank (Subcommittee 3d) (effective June 12, 1970)

D 632 - 70 (formerly D 632 - 66), Specification for Sodium Chloride (Subcommittee 3b) (effective June 12, 1970)

D 946 - 69a (formerly D 946 - 69), Specifications for Asphalt Cement for Use in Pavement Construction (Subcommittee 4a) (effective Nov. 14, 1969)

D 1559 - 70 (formerly D 1559 - 65), Test for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus (Subcommittee 2a) (effective June 12, 1970)

D 2026 - 69 (formerly D 2026 - 68), Specifications for Liquid Asphalt (Slow-Curing Type) (Subcommittee 4a) (effective Nov. 14, 1969)

Reapproval of Standards:

D 692 - 63 (1969), Specifications for Coarse Aggregate for Bituminous Paving Mixtures

D 1073 - 63 (1969), Specifications for Fine Aggregate for Bituminous Paving Mixtures

All of the revised standards appear in the

1970 Annual Book of ASTM Standards, Part 11, except for D 70, D 242, D 517, D 1559, and D 2872, which will appear in the 1971 Annual Book of ASTM Standards, Part 11, and D 8, D 632, and D 2628, which will appear in the 1970 Annual Book of ASTM Standards, Part 10.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee 1b on Editorial and Definitions (W. K. Parr, chairman) is continuing its review of the definition of "bitumen."

Subcommittee 1e on Statistical Procedures and Evaluation of Data (R. L. Davis, chairman) is considering the problems in applying sampling and test method precision to choosing specification limits and establishing acceptance procedures.

Subcommittee 2a on Mechanical Tests of Bituminous Mixes (L. F. Rader, chairman) is considering a proposed Method of Test for Resistance to Plastic Flow of Bituminous Materials using Stability and Flow Recording Apparatus. Another proposed method being prepared is the proposed Method of Test for Flexure Test of Bituminous Mixtures. A round-robin test program is underway on samples of asphaltic mixtures using the Gyrotory Testing Machine.

Subcommittee 2b on Specific Gravity and Density of Bituminous Mixtures (J. M. Rice, chairman) has prepared a proposed Method of Test for Density of Bituminous Concrete-in-Place by Nuclear Method. This method is ready for committee approval.

Subcommittee 2c on Effect of Water and Other Elements on Bituminous Coated Aggregates (W. H. Goetz, chairman) is sponsoring two test programs for the purpose of establishing precision limits for the Marshall Immersion Test and the Immersion Compression Test.

Subcommittee 2d on Plant-Mix Bituminous Surfaces and Bases (R. N. Simberg, chairman) is considering a field test method for permeability. Work has been initiated on acceptance procedures for bituminous concrete mixtures. Another project is the development of criteria and descriptions of hot storage and surge bins for bituminous concrete mixtures.

Subcommittee 2e on Bituminous Macadam and Surface Treatments (C. W. Chaffin, chairman) is developing a proposed recommended practice for determining the applica-

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tion rate of bituminous distributors. Work is continuing on specifications for slurry seal. Surface treatment terminology is being reviewed for a possible ASTM Recommended Terminology for Surface Treatment.

Subcommittee 2f on Extraction and Recovery of Constituents from Bituminous Mixtures (N. L. Smith, Jr., chairman) has completed a study on polar adjuncts to solvents. A proposed vacuum method of extraction is ready for subcommittee consideration and approval. A precision statement for tests of binders recovered by Method D 1856, Test for Recovery of Asphalt from Solution by Abson Method, is being prepared.

Subcommittee 3d on Bituminous Joint Fillers, Sealers and Asphalt Planks (E. R. Oglio, chairman) is obtaining data on the water absorption test and requirements for preformed joint fillers. A proposed specification for wood fiber preformed joint filler is being prepared.

Subcommittee 3f on Skid Resistance (J. H. Dillard, chairman) is obtaining the views of a number of agencies using the insoluble residue test. Information is being collected covering seven aggregates in order to select standard aggregates for research in slipperiness. A task group is preparing a list of factors to be used in establishing minimum standards.

Subcommittee 4a on Asphalt Specifications (J. O. Izatt, chairman) has a task group which is developing proposals encompassing benefits of measurements at 77 F and 140 F in ASTM Specification D 946, for Asphalt Cement for Use in Pavement Construction.

Subcommittee 4b on Emulsified Asphalt Specifications (J. Y. Welborn, chairman) is preparing a recommended practice for application of emulsified asphalts.

Subcommittee 4c on Emulsified Asphalt Tests (Paul E. McCoy, chairman) has completed a round-robin study of proposed rapid field tests and are analyzing the data.

Subcommittee 4d on Specifications and Tests for Tar and Tar Products (P. F. Phelan, chairman) has completed two round-robin test programs: a study of data from nine laboratories using the adaptation of the Brookfield viscosity equipment which has indicated good agreement on lower viscosity tars and test data on distillation, using a proposed revision of ASTM Method D 20,

Test for Distillation of Tars and Tar Products, showed most of the results fell within a fairly narrow range. A task group will consider a specification for rubberized tar binder.

Subcommittee 4e on Rheological Tests (W. J. Halstead, chairman) has four active groups studying (1) a complete revision of ASTM Method D 5 to establish a joint ASTM-IP designation, (2) the effect of temperature variation in the ductilometer bath on ductility results, (3) the establishment of a joint ASTM-IP method for kinematic and absolute viscosity, and (4) the need for low temperature (high viscosity) rheology measurements.

Subcommittee 4f on Distillation Tests (R. V. Witter, acting chairman) is studying distillation residues and their effect on test results.

Subcommittee 4g on Durability Tests (V. P. Puzinauskas, chairman) has reviewed the standards under its jurisdiction and recommended further refinement in the form of editorial changes.

Subcommittee 4h on Miscellaneous Asphalt Tests (H. H. Mc Cown, chairman) is continuing its precision study of ASTM Method D 70, Test for Specific Gravity of Semi-Solid Bituminous Materials, using tar pitch samples. A method of determining specific gravity of liquid asphalts (including emulsions) by means of a hydrometer is under consideration. The determination of insolubles (asphaltenes) in normal pentane is under study.

Subcommittee 5a on Aggregate Specifications (J. Paul Martin, chairman) has been occupied with revisions of standards under its jurisdiction, all of which were approved and presented to Committee D-4.

Subcommittee 5b on Aggregate Tests (F. P. Nichols, Jr., chairman) is investigating the need for an appropriate test method to determine the tendency of aggregates to degrade and form deleterious fines. A task group is considering a method of test to indicate particle shape characteristics which might relate to the quality of dense graded aggregate materials.

Respectfully submitted on behalf of the committee,

L. F. RADER,
Chairman

B. F. KALLAS,
General Secretary

REPORT OF COMMITTEE D-5 ON COAL AND COKE

Committee D-5 on Coal and Coke held two meetings during the year, in Atlantic City, N. J., June 25, 1969, and in Cincinnati, Ohio, Dec. 10, 1969. Subcommittees and subordinate groups held meetings at Atlantic City, at Cincinnati, and at other times and places as indicated.

The committee consists of 111 members representing 90 voting interests classified as follows: 29 producers, 31 consumers, and 30 general interest. In addition, a group of 30 consulting members and alternates, having experience and expertise in specific disciplines, have been recruited to assist in problems relating to sampling, analysis, classifications, statistics, and petrography of coal, coke, and fuel briquets. The committee also has two honorary members.

The paper, "Status of International Standardization Relating to Coal and Coke," by R. L. Coryell and R. F. Abernethy (January 1969) is being revised to reflect developments during 1969. Submission for publication in a journal is planned.

In accordance with Article V, Section 3 of Committee D-5 bylaws, the following officers were elected for a two-year term beginning with the close of the 1970 Annual Meeting of the Society:

Chairman, R. A. Glenn (General Interest)
Vice-Chairman, C. R. Montgomery (Producer)

Secretary, W. J. Montgomery (General Interest)

Executive, J. D. Clendenin (Consumer),
T. A. Miskimen (Consumer), and T. R. Scolon (General Interest)

RECOMMENDATIONS ACCEPTED BY THE COMMITTEE ON STANDARDS

Subsequent to the 1969 Annual Meeting, Committee D-5 presented to the Society through the Committee on Standards the

following recommendations which became effective on the dates indicated:

New Tentatives:

D 2797 - 69 T, Preparing Coal Samples for Microscopical Analysis by Reflected Light (Subcommittee XXVIII) (effective July 25, 1969)

D 2798 - 69 T, Determining Microscopically the Reflectance of the Organic Components in a Polished Specimen of Coal (Subcommittee XXVIII) (effective July 25, 1969)

These two tentative methods are part of a series of three being developed for the petrographic analysis of coal. This system of analysis is based on a new set of parameters for evaluation of coals.

D 2799 - 69 T, Microscopical Determination of Volume Percent of Physical Components of Coal (Subcommittee XXVIII) (effective Nov. 7, 1969)

This new tentative method covers microscopical determination of the physical components of coal.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee D-5 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which became effective on the dates indicated:

New Standard:

D 2796 - 69, Definitions for Lithologic Classes and Physical Components of Coal (Subcommittee XVIII) (effective Oct. 3, 1969)

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Adoption of Tentative as Standard without Revision:

D 2490 - 70, (formerly D 2490 - 66 T), Tumbler Test for Small Coke (Subcommittee XXII) (effective May 29, 1970)

Revision of Standards, Immediate Adoption:

D 1812 - 69, Plastic Properties of Coal by the Gieseler Plastometer (Subcommittee XV) (effective Dec. 19, 1969)

Reapproval of Standards without Revision:

D 121 - 62 (1969), Definition of Terms Relating to Coal and Coke (Subcommittee II)

D 291 - 60 (1969), Test for Cubic Foot Weight of Crushed Bituminous Coal (Subcommittee VII)

D 311 - 30 (1969), Test for Sieve Analysis of Crushed Bituminous Coal (Subcommittee VII)

D 407 - 44 (1969), Definitions of the Terms Gross Calorific Value and Net Calorific Value of Solid and Liquid Fuels (Subcommittee II)

D 410 - 38 (1969), Test for Analysis of Coal (Subcommittee VII)

D 440 - 49 (1969), Drop Shatter Test for Coal (Subcommittee VII)

D 441 - 45 (1969), Tumbler Test for Coal (Subcommittee VII)

D 547 - 41 (1969), Test for Index of Dustiness of Coal and Coke (Subcommittee VII)

AMERICAN NATIONAL STANDARDS

The following standards have been approved during the year as American National Standards by the American National Standards Institute:

D 121 - 62; ANSI K20.6-1970 Definitions of Terms Relating to Coal and Coke

D 293 - 69; ANSI K20.6-1970 Test for Sieve Analysis of Coke

D 410 - 38 (1969); ANSI K20.8-1970 Test for Sieve Analysis of Coal

D 440 - 49 (1969); ANSI K20.9-1970 Drop Shatter Test for Coal

D 441 - 45 (1969); ANSI K20.10-1970 Tumbler Test for Coal

D 547 - 41 (1969); ANSI K20.11-1970 Test for Index of Dustiness of Coal and Coke

D 720 - 67; ANSI K20.12-1970 Test for Free-Swelling Index of Coal

D 1412 - 61 (1968); ANSI K20.13-1970 Test for Equilibrium Moisture of Coal at 96 and 97 Percent Relative Humidity and 30 C

D 1756 - 62 (1969); ANSI K20.14-1970 Test for Carbon Dioxide in Coal

D 1757 - 62 (1969); ANSI K20.15-1970 Test for Sulfur in Coal Ash

D 1857 - 68; ANSI K20.16-1970 Test for Fusibility of Coal and Coke Ash

D 2013 - 68; ANSI K20.17-1970 Preparing Coal Samples for Analysis

D 2014 - 64; ANSI K20.18-1970 Test for Expansion or Contraction of Coal by the Sole-Heated Oven

D 2015 - 66; ANSI K20.19-1970 Test for Gross Calorific Value of Solid Fuel by the Adiabatic Bomb Calorimeter

D 2234 - 68; ANSI K20.20-1970 Sampling of Coal

D 2361 - 66; ANSI K20.21-1970 Test for Chlorine in Coal

D 2492 - 68; ANSI K20.22-1970 Test for Forms of Sulfur in Coal

D 2640 - 67; ANSI K20.23-1970 Drop Shatter Test for Large Coke

The following ASTM Standards were recommended by Committee D-5 as American National Standards:

D 2490 - 70, Method of Tumbler Test for Small Coke

D 2677 - 70, Method of Test for Lightability of Barbecue Briquets

D 2796 - 69, Definitions for Lithologic Classes and Physical Components of Coal

ACTIVITIES OF SUBCOMMITTEES

Executive Committee (R. F. Abernethy, chairman) took the following actions on committee administrative matters:

1. Accepted an interim report by Task Group H on Classification of Voting Interests but deferred further consideration of a negative vote on a letter ballot to amend Section 2, Article IV, of Committee D-5 bylaws until the Society had completed its review of criteria for classification of voting interests and of regulations on balloting.

2. Appointed a special Task Group I (R. T. Bard, chairman) to work with Committee D-2 in the development of a definition of

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"coke" in relation to the term "petroleum coke."

3. Reviewed liaison activities of Committee D-5 with other technical committees to establish if proper liaison is being maintained.

4. Accepted report of Task Group G, Methods of Analysis of Coals of Low Rank (C. C. Boley, chairman), and elected to keep the task group active to consider future developments in the application of present methods of analysis to coal of low rank.

5. Assigned Subcommittee II the added responsibility of editing drafts of all proposed standards as they are developed by the subcommittees. In light of this new assignment, a review of the stated scope of Subcommittee II by the Task Group on Scopes and bylaws was requested.

6. Appointed Task Group J, Total Moisture in Coal (S. J. Aresco, chairman, and Robert Hensel, member) to draft a single method for determination of total moisture in coal.

7. Appointed C. C. Boley to serve as chairman of Task Group on Long-Range Planning, which was formerly chaired by Reed Scollon.

Subcommittee II on Nomenclature and Definitions (R. T. Bard, chairman) appointed a special task group to maintain contact with other subcommittees and keep informed on developments in the entire area of moisture technology. Subcommittee II continued on its assignment of editing all standards under jurisdiction of Committee D-5. A special task group was appointed to explore and develop a suitable definition of coke for use in Committee D-5 standards.

Subcommittee VII on Physical Characteristics of Coal (G. Gould, chairman) completed review of all standards for which Subcommittee VII has responsibility. Revision of Method D 409, Test for Grindability of Coal by the Hardgrove-Machine Method, was completed and a recommendation was made to Committee D-5 for its approval. Review and revision of Method D 291, Test for Cubic Foot Weight of Crushed Bituminous Coal, continues. Work was initiated combining the various standards dealing with size consisting of coal; namely, Method D 310, Test for Size of Anthracite, Method D 311, Test for Sieve Analysis of Crushed

Bituminous Coal, Method D 410, Test for Sieve Analysis of Coal, and Method D 431, Designating the Size of Coal from its Sieve Analysis. The D-5 interest in sieves and screening formerly in Committee E-1, Subcommittee 10, is now in Committee E-29, Sieve Testing and Particle Size Measurement. Further review of Method D 197, Sampling and Fineness Test of Pulverized Coal, has been initiated to establish if it is of sufficient use to be retained as standard.

Subcommittee XV on Plasticity and Swelling of Coal (J. R. Cameron, chairman) completed the revision of Method D 1812, Test for Plastic Properties of Coal by the Gieseler Plastometer, and made a recommendation for its acceptance. Similarly, the revision of the tentative Method D 2639, Test for Plastic Properties of Coal by Constant Torque Gieseler Plastometer, was completed and its acceptance recommended. Review of Method D 2014, Test for Expansion or Contraction of Coal by the Sole-Heated Oven, was initiated. Work on development of a standard for the movable wall oven continues with the task group planning to hold a separate meeting in Cleveland, March 19, 1970. Correlation of data on the plasticity of coal by the constant-torque Gieseler plastometer with other parameters continues.

Subcommittee XVIII on Classification of Coals (R. A. Glenn, chairman) reviewed the recently adopted Definitions D 2796-69, Lithologic Classes and Physical Components of Coal (effective Oct. 3, 1969) and made recommendations for its editorial revision. The study of the relationship of the reflectance properties of coals with other rank parameters was continued with cooperation of Subcommittee XXVIII, Petrographic Analysis of Coal.

Subcommittee XXI on Methods of Analysis (W. J. Montgomery, chairman) continued the development of adequate methods for determining moisture, with the subcommittee chairman serving on special task groups appointed by the Chairman of D-5. Draft of a method for "Total Moisture in an 8-Mesh Laboratory Sample" is to be balloted soon by the subcommittee. In addition to moisture, Section A is giving attention to the determination of ash. Section B continues its evaluation of the high-temperature method for sulfur. Section C is preparing a simpli-

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fied procedure for isothermal calorimetry for balloting.

Subcommittee XXII on Physical Tests of Coke (M. Perch, chairman) completed the revision of Method D 2490, Tumbler Test for Small Coke, and recommended its adoption as standard. A study of the effect of cylindrical and cubical containers on the measurement of the cubic foot weight of coke is continuing.

Subcommittee XXIII on Sampling (T. A. Miskimen, chairman) continued its work on development of consistent definitions in methods for sampling and for moisture determination, on bias of increments, on selection of increments, on replicate sampling, on location of sampling and weighing. Work continued on the development of a method of sampling coke for moisture determination and the consolidation of all methods of coke sampling. The revision of Method D 2013, Preparing Coal Samples for Analysis, and Method D 2234, Sampling of Coal, is underway.

Subcommittee XXIV on Statistics (A. A. Orning, chairman) continued to support work of other subcommittees by providing statistical analyses of round-robin data and guidance in the development of statements of reproducibility. Assistance was provided Subcommittee XV in particular regarding the tolerances permitted in the determination of plasticity of coal.

Subcommittee XXV on Physical Testing of Fuel Briquets (J. W. Eckerd, chairman) completed its review of Method D 2677, Test for Lightability of Barbecue Briquets, and made a recommendation for its adoption as standard. The subcommittee also began an evaluation of the need for a test to determine the quality of barbecue briquets supplied in bags to customers at retail outlets.

Subcommittee XXVII, American Group ISO/TC 27 on Solid Mineral Fuels (C. R. Montgomery, chairman) held two meetings during the year: in Atlantic City, N. J., June 24, 1969, and in Cincinnati, Ohio, Dec. 9, 1969. A summary of actions taken at these meetings follows:

1. Approved ISO/TC 27 SC 3 (Secretariat 2) Sampling of Coke.

2. Approved ISO/TC 27 (Secretariat 761) 1029, Alternative Procedures for Oxygen.

3. Approved ISO/TC 27 (Secretariat 756) 1024—Draft ISO Recommendation No. 1881—Determination of the Mechanical Strength of Coke Not Greater than 60 mm Top Size.

4. Voted to retain ISO Recommendation No. 350, Determination of Chlorine in Coal by the Bomb Combustion Method: ISO/TC 27 (Secretariat 470) 668E.

5. Approved the withdrawal of ISO Recommendation No. 159, Determination of Total Sulfur in Coal by the Strambi Method: ISO/TC 27 (Secretariat 213) 332.

6. Approved ISO/TC 27 (Secretariat 794) 1062—Draft ISO Recommendation for the Sampling of Coke.

7. Approved ISO/TC 27 (Secretariat 796) 1064—Draft ISO Recommendation for Size Analysis of Small Coke.

8. Approved ISO/TC 27 (Secretariat 766) 1034—Draft ISO Recommendation for Determination of the Gross Calorific Value of a Solid Fuel by the Calorimetric Bomb Method and Calculation of Its Net Calorific Value.

Subcommittee XXVIII on Petrographic Analysis of Coal (J. D. Clendenin, chairman) initiated a review of the three recently accepted tentative methods for determining the physical components of coal: Method D 2797, Preparing Coal Samples for Microscopical Analysis by Reflected Light, Method D 2798, Determining Microscopically the Reflectance of Organic Components in a Polished Specimen of Coal, and Method D 2799, Microscopical Determination of Volume Percent of Physical Components of Coal. Work was continued on the development of a continuing supply of reference glass standards for use in these tests. Planning and development of a program of proposed work was initiated.

Respectfully submitted on behalf of the committee,

R. F. ABERNETHY,
Chairman

R. A. GLENN,
Secretary

REPORT OF COMMITTEE D-6 ON PAPER AND PAPER PRODUCTS

Committee D-6 on Paper and Paper Products held one meeting during the year, on Feb. 18, 1970. The Executive Committee met on April 28, 1969, at ASTM Headquarters to discuss the reorganization of Committee D-6, the joint effort between ASTM and TAPPI being extended to the higher levels of balloting, and that provisions be made for joint editorial effort with the aim of achieving identity of test method documents.

The committee consists of 66 members, of whom 27 are producers, 17 consumers, and 22 general interest members.

The Executive Committee formed an ad hoc committee with Malcolm Taylor as chairman, to review the methods for processing and editing D-6 and TAPPI methods, especially those resulting from TAPPI-ASTM joint committees, with a view to expediting the ASTM processing of such methods. A meeting was held on June 23, 1969, at Mr. Taylor's office. Copies of the ad hoc committee report are available.

The following officers were elected for the ensuing two-year term:

Chairman, C. E. Brandon.

Vice-Chairman, H. L. Averbach.

Secretary, John Fachet.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee D-6 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which were accepted by the Society effective on the dates indicated:

New Standard:

D 2808 - 69, Method for Short Column Test of Corrugated Fiberboard in the Cross-

Machine Direction (Subcommittee D-6.40) (effective July 18, 1969)

This method covers the procedure for determining the edge-wise compressive strength, parallel to the flutes, or single-wall, double-wall, or triple-wall corrugated fiberboard.

Reapproval of Standards:

D 528 - 63 (1970), Method of Test for Machine Direction of Paper (Subcommittee II)

D 589 - 65 (1970), Method of Test for Opacity of Paper (Subcommittee II)

D 644 - 55 (1970), Method of Test for Content of Paper and Paperboard by Oven Drying (Subcommittee II)

D 686 - 59 (1970), Method of Test for Qualitative Examination of Mineral Filler and Mineral Coating of Paper (Subcommittee II)

D 727 - 45 (1970), Method of Test for Kerosine Number of Roofing and Flooring Felt by the Vacuum Method (Subcommittee II)

D 773 - 47 (1970), Method of Test for Adhesive of Gummed Tape (Subcommittee II)

D 780 - 46 (1970), Method of Test for Printing Ink Permeation of Paper (Castor Oil Test) (Subcommittee II)

D 921 - 58 (1970), Method of Test for Titanium Dioxide in Paper (Subcommittee II)

D 984 - 61 (1970), Method of Test for Reducible Sulphur in Paper (Subcommittee II)

D 1030 - 65 (1970), Method of Test for Fiber Analysis of Paper and Paperboard (Subcommittee II)

D 1161 - 60 (1970), Method of Test for Total Chloride Content of Paper and Paper Products (Subcommittee II)

D 1224 - 63 (1970), Method of Test for

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Zinc and Cadmium in Paper (Subcommittee II)

D 2019 - 65 (1970), Method of Test for Dirt in Paper and Paperboard (Subcommittee II)

D 2043 - 69 (1970), Method of Test for Silver Tarnishing by Paper (Subcommittee T-5)

The new standard D 2808 appears in the 1970 *Annual Book of ASTM Standards*, Part 15. All of the reapproved standards will appear in the 1971 edition.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee D-6.10 on Precision and Sampling (H. J. Ladue, chairman) and *Subcommittee D-6.20 on Paper Test Methods* (R. F. Traver, chairman) continued to function effectively as joint TAPPI-ASTM com-

mittees. Because of recent reorganization with TAPPI committee structure, the number of joint TAPPI-ASTM committees will be expanded in the near future.

Subcommittee D-6.40 on Container Board Test Methods (Myron Clark, chairman), while not a joint committee with TAPPI, usually meets with the TAPPI Corrugated Containers Division.

Subcommittee D-6.50 on Specification for Paper (Lafayette Price, chairman) and *Subcommittee D-6.02, Editorial Subcommittee* (W. R. Willets, chairman), have not been active this year.

Respectfully submitted on behalf of the committee,

T. W. LASHOF,
Chairman

JOHN FACHET,
Secretary

REPORT OF COMMITTEE D-7 ON WOOD

Committee D-7 on Wood and its subcommittees met at the U. S. Forest Products Laboratory, Madison, Wis., on Sept. 22-24, 1969. There were 60 members and 3 guests in attendance at the annual business meeting of the committee on September 24 and eleven subcommittees held meetings during Sept. 22 and 23.

The committee membership secretary presented a list of 197 voting members current in September 1969—97 producer, 19 consumer, and 81 general interest members, plus a list of 24 consulting members. He reported a loss of 25 members including 2 consulting members. These losses were due to retirements, job changes, non-payment of dues, resignations, and deaths. There were 14 applications for membership. The committee presently has 4 honorary members.

The following persons were elected as committee officers and members of the D-7 Executive Committee.

Chairman, W. A. Oliver

Vice Chairmen, R. G. Kimbell, Jr., and W. C. Lewis

Secretary, J. G. Shope

Membership Secretary, R. A. LaCosse

Members of the D-7 Executive Committee—L. J. Markwardt, T. E. Brassell, N. I. Pinson, R. D. Arsenault, D. E. Kennedy, J. A. Liska, J. M. Hess

These persons are elected to serve for a two-year period beginning at the end of the ASTM Annual Meeting on June 26, 1970. The Nominating Committee consisted of R. G. Kimbell, Jr., Chairman, Gustave Barshevsky, D. L. Davis, F. J. Hanrahan, and W. G. Youngquist.

RECOMMENDATIONS ACCEPTED BY THE COMMITTEE ON STANDARDS

Subsequent to the 1969 annual report, Committee D-7 presented to the Society

through the Committee on Standards the following recommendations which became effective on the dates indicated:

New Tentatives:

D 2898 - 70 T, Test for Durability of Fire-Retardant Treatment of Wood (Subcommittee XII) (effective May 8, 1970)

D 2899 - 70 T, Test for Establishing Design Stresses for Round Timber Piles (Subcommittee VII) (effective June 12, 1970)

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee D-7 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which were accepted by the Society effective on the dates indicated:

Revision of Standards:

D 25 - 70 (formerly D 25 - 58), Specification for Round Timber Piles (Subcommittee VII) (effective May 15, 1970)

D 2481 - 70 (formerly D 2481 - 69), Accelerated Evaluation of Wood Preservatives for Marine Service by Means of Small-Size Specimens (Subcommittee XIII) (effective July 10, 1970)

D 2555 - 70 (formerly D 2555 - 69), Establishing Clear Wood Strength Values (Subcommittee XVII) (effective May 15, 1970)

Reapproval of Standards:

D 38 - 33 (1970), Sampling and Testing Creosote (Subcommittee VI)

D 52 - 62 (1970), Specification for Wood Paving Blocks for Exposed Platforms, Pavements, Driveways, and Interior Floors Exposed to Wet and Dry Conditions (Subcommittee IV)

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- D 347-33 (1970)**, Volume and Specific Gravity Correction Tables for Creosote and Coal Tar (Subcommittee VI)
- D 805-63 (1970)**, Testing Veneer, Plywood, and Other Glued Veneer Constructions (Subcommittee III)
- D 1031-59 (1970)**, Specification for Creosoted End-Grain Wood Block Flooring for Interior Use (Subcommittee IV)
- D 1033-50 (1970)**, Chemical Analysis of Chromated Zinc Chloride (Subcommittee VI)
- D 1038-52 (1970)**, Definitions of Terms Relating to Veneer and Plywood (Subcommittee III)
- D 1272-56 (1970)**, Specification for Pentachlorophenol (Subcommittee VI)
- D 1324-60 (1970)**, Specification for Modified Wood (Subcommittee IX)
- D 1326-56 (1970)**, Chemical Analysis of Ammoniacal Copper Arsenite (Subcommittee VI)
- D 1413-61 (1970)**, Testing Wood Preservatives by Laboratory Soil-Block Cultures (Subcommittee XIII)
- D 1666-64 (1970)**, Conducting Machining Tests of Wood and Wood-Base Materials (Subcommittee IX)
- D 1758-62 (1970)**, Evaluating Wood Preservatives by Field Tests with Stakes (Subcommittee XIII)
- D 1759-64 (1970)**, Conducting Shear-Block Test for Quality Control of Glue Bonds in Scarf Joints (Subcommittee II)
- D 1858-63 (1970)**, Specification for Creosote-Petroleum Solution (Subcommittee VI)
- D 1860-63 (1970)**, Test for Moisture and Creosote-Type Preservative in Wood (Subcommittee VI)
- D 2017-63 (1970)**, Accelerated Laboratory Test of Natural Decay Resistance of Woods (Subcommittee XIII)
- D 2164-65 (1970)**, Tests for Structural Insulating Roof Deck (Subcommittee XV)

The new tentative and revised standards appear in the 1970 *Annual Book of ASTM Standards*, Part 16.

ACTIVITIES OF SUBCOMMITTEES

Executive Committee (W. A. Oliver, chairman)—Among other matters considered at the meeting of Sept. 22, 1969, were appointments of subcommittee chairmen as

follows: T. E. Brassell to replace F. J. Hanrahan on Subcommittee II, Laminated Timber, L. R. Gjovik to replace Theodore Scheffer on Subcommittee XIII, Durability and Exposure, and R. J. Hoyle to replace R. L. Ethington on Subcommittee XVII, Clear Wood.

Upon the recommendation of its chairman, W. G. Youngquist, Subcommittee VIII, Modified Wood and Wood-Base Materials, was disbanded and the Standard D 1324, Specification for Modified Wood, under its jurisdiction was transferred to the jurisdiction of Subcommittee IX, Methods of Testing.

The committee recommended that R. R. Cahal in view of his many years of service to Committee D-7 be elected an Honorary Member. This was confirmed at the Annual Business Meeting.

The time and place for the Annual Meeting of Committee D-7 was reconfirmed as the first three days of the last full week in September at the U. S. Forest Products Laboratory, Madison, Wis.

Subcommittee I on Lumber (R. G. Kimbell, Jr., chairman)—At its meeting of Sept. 23, 1969, Subcommittee I completed its discussion of the proposed Tentative Recommended Method for Evaluating Allowable Properties for Grades of Structural Lumber and submitted it through the usual procedures for adoption as a tentative by the Society.

The subcommittee accepted the recommendation of a task group investigating a random product method of establishing stresses, that there was no need to have such a random product procedure in addition to standards presently available.

Editorial revisions of D 245-69, Establishing Structural Grades and Related Allowable Properties for Visually Graded Lumber, were reviewed and recommended for adoption as standard by the Society.

Subcommittee I recommended that the D-7 Executive Committee consider the establishment of a new subcommittee to have as its general responsibility the development of a standard covering adjustments to working stresses or other allowable property values for various conditions of use and exposure to which lumber and other wood products are subjected.

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Subcommittee II on Laminated Timber (F. J. Hanrahan, chairman)—While the subcommittee did not meet at Madison, progress was made through correspondence on the development of a better system for establishing working stresses for structural glued laminated timbers. The subcommittee also recommended for readoption without change D 1759-64 Method of Conducting Shear-Block Test for Quality Control of Glue Bonds in Scarf Joints.

Subcommittee III on Plywood (J. M. Hess, chairman) (reported by J. A. Liska)—A task group of the subcommittee is working to update the standards D 805-63, Standard Methods of Testing Veneer, Plywood and Other Glued Veneered Constructions, and D 1038-64, Standard Definitions of Terms Relating to Veneer and Plywood, but in order to meet the ASTM time requirements, the subcommittee is submitting the two standards for reapproval without change.

Subcommittee IV on Wood Paving Block (W. R. Ganser, chairman) submitted for reapproval without change D 52-62, Specification for Wood Paving Block, and D 1031-59, Specification for Creosoted End-Grain Wood Block Flooring.

Subcommittee V on Method of Preservative Treatment of Timber (C. W. Best, chairman) submitted for approval with revisions, both editorial and substantive, D 1760-69, Specification for Pressure Treatment of Timber Products.

Subcommittee VI on Timber Preservatives (G. B. Fahlstrom, chairman) submitted the following for approval as standard with revisions:

- D 1032-64, Specification for Chromated, Zinc Chloride
- D 1325-64, Specification for Ammoniacal Copper Arsenite
- D 1624-68, Specification for Acid Copper Chromate

For reapproval as standard without revision:

- D 38-64, Methods of Sampling and Testing Creosote
- D 1033-64, Method for Chemical Analysis of Chromated Zinc Chloride
- D 347-64, Volume and Specific Gravity Correction Tables for Creosote and Coal Tar

D 1272-64, Specification for Pentachlorophenol

D 1326-64, Methods for Chemical Analysis of Ammoniacal Copper Arsenite

D 1858-63, Specification for Creosote-Petroleum Solution.

D 1860-63, Test for Moisture and Creosote-Type Preservative in Wood

For approval as standard of certain revisions to the following:

D 1034-62, Specification for Fluor-Chrome-Arsenate-Phenol

D 1035-62, Methods for Chemical Analysis of Fluor-Chrome-Arsenate-Phenol

D 1274-64, Methods for Chemical Analysis of Pentachloro-Phenol

D 1859-63, Specification for Petroleum for Blending with Creosote

Subcommittee VII on Wood Poles and Piling (R. H. Bescher, chairman) has submitted for approval as standard, the proposed revision of D 25-64, Specification for Round Timber Piles, and has completed a proposed Method for Establishing Design Stresses for Round Timber Piles and recommended its acceptance as a tentative.

Subcommittee VIII on Modified Wood and Wood-Base Materials—Upon the recommendation of W. G. Youngquist the assignment of this subcommittee has been transferred to Subcommittee IX.

Subcommittee IX on Methods of Testing (A. D. Freas, chairman) has submitted for reapproval as standard D 1666-64, Method of Conducting Machining Tests of Wood and Wood-Base Materials. It accepted the transference to its jurisdiction of D 1324-60, Standard Specification for Modified Wood, and submitted it for reaffirmation as standard. This last is considered an interim action to maintain the existence of the standard while a task group reviews it for possible revision.

Subcommittee X on Nomenclature and Definition (R. R. Cahal, chairman) a standby subcommittee. No meeting was held and there is no work in progress.

Subcommittee XII on Fire-Retardant Wood (H. W. Eickner, chairman) (reported by D. R. Countryman)—During the past two years a task group on Durability of Fire-Retardant Treated Wood has reviewed two

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proposed methods of exposing fire retardant treated wood to accelerated weathering prior to fire testing. Since both test methods have been used, and appear to give comparable results, the task group recommended that both be proposed as a tentative standard. Approving of the task group's recommendation, the subcommittee submitted for approval as a tentative standard the proposed method of test for Durability of Fire-Retardant Treatment of Wood.

The subcommittee is continuing the study of a proposed method for measuring the Hygroscopic Properties of Fire-Retardant Treated Wood.

Subcommittee XIII on Durability and Exposure (L. R. Gjovik, chairman) submitted for approval as standard certain revisions of D 2481 - 69, Method of Accelerated Evaluation of Wood Preservatives for Marine Services by Means of Small-Sized Specimens. The subcommittee also submitted for reapproval the following standards.

- D 1413 - 61**, Method of Testing Wood Preservatives by Laboratory Soil-Block Cultures
- D 1758 - 62**, Methods of Evaluating Wood Preservatives by Field Tests with Stakes
- D 2017 - 63**, Method for Accelerated Laboratory Test of Natural Decay Resistance of Woods.

The subcommittee reported progress on the development of a possible laboratory test

of termite resistance and expects to propose a method next year.

Subcommittee XV on Wood-Base Fiber and Particle Panel Materials (Gustave Barshesky, chairman) submitted for approval as standard certain revisions of D 1037 - 64, Methods of Evaluating the Properties of Wood-Base Fiber and Particle Panel Materials. The subcommittee also submitted for reapproval as standard D 2164 - 65, Methods of Tests for Structural Insulating Roof Deck.

Subcommittee XVII on Clear Wood (R. L. Ethington, chairman) submitted for approval as standard a revision to D 2555 - 69, Methods of Establishing Clear Wood Strength Values. The revision consists of the inclusion of a table of timber volumes for Canadian species.

Miscellaneous, W. C. Lewis, Vice Chairman of Committee D-7 reported an attendance of 72 at the annual Committee D-7 dinner on September 23. A presentation was made to R. R. Cahal by his friends at the FPL in recognition of his retirement. The speaker of the evening was W. G. Youngquist who discussed wildlife in the border waters of United States and Canada.

Respectfully submitted on behalf of the committee,

W. A. OLIVER,
Chairman

J. G. SHOPE,
Secretary

REPORT OF COMMITTEE

D-8 ON BITUMINOUS AND OTHER ORGANIC MATERIALS FOR ROOFING, WATERPROOFING, AND RELATED BUILDING OR INDUSTRIAL USES

Committee D-8 on Bituminous and Other Organic Materials for Roofing, Waterproofing, and Related Building or Industrial Uses, and its subcommittees held two meetings during the year: on June 23 to 25, 1969, in Atlantic City, N. J., and on Dec. 10 to 12, 1969, in Cincinnati, Ohio.

The committee consists of 120 voting members, of whom 63 are classified as producers, 22 as consumers, and 35 as general interest members. The committee also has five honorary members.

It is with deep sorrow that we report the death of J. Q. McCawley.

The committee adopted several revisions in the regulations governing Committee D-8 at the December meeting.

Subcommittee D-8.15 on Rheological Properties was put on inactive status.

J. W. Donegan was appointed chairman of Subcommittee D-8.01 on Nomenclature, Definitions, and Editorial to replace H. L. Stasse.

RECOMMENDATIONS ACCEPTED BY THE COMMITTEE ON STANDARDS

Subsequent to the 1969 annual report, Committee D-8 presented the following recommendation to the Society through the Committee on Standards which became effective on July 25, 1969:

New Tentative:

D 2829 - 69 T, Recommended Practice for Sampling and Analysis of Built-up Roofs (Subcommittee D-8.20)

This recommended practice provides for standardized sampling and analysis now being performed without any rational control or reference.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee D-8 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which were accepted by the Society effective on the dates indicated:

New Standard Specifications for:

D 2822 - 69, Asphalt Roof Cement (Subcommittee D-8.05) (effective Oct. 30, 1969)

These specifications cover asphalt roof cement suitable for trowel application to roofings and flashings.

D 2823 - 69, Asphalt Roof Coatings (Subcommittee D-8.05) (effective Sept. 19, 1969)

These specifications cover asphalt roof coatings of brushing consistency.

D 2824 - 69, Asphalt-Based, Aluminum Roof Coatings (Subcommittee D-8.05) (effective Sept. 19, 1969)

These specifications cover asphalt-aluminum roof coating suitable for application to roofing or masonry surfaces by brushing or spraying.

Adoption of Tentatives as Standard Without Revision:

D 36 - 70 (formerly D 36 - 66 T), Method of Test for Softening Point Asphalts and Tar Pitches (Ring-and-Ball Apparatus) (Subcommittee D-8.04) (effective July 24, 1970)

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D 2523 - 70 (formerly D 2523 - 66 T), Recommended Practice for Testing Load-Strain Properties of Roof Membranes (Subcommittee D-8.20) (effective July 15, 1970)

Revision of Standard Method of Test for:

D 61 - 70 (formerly D 61 - 68), Softening Point of Pitches (Cube-In-Water Method) (Subcommittee D-8.17) (effective Aug. 14, 1970)

Data from a round-robin test became available and values of repeatability and reproducibility were updated in Section 10.

D 71 - 70 (formerly D 71 - 52), Specific Gravity of Solid Pitch and Asphalt (Displacement Method) (Subcommittee D-8.17) (effective Aug. 14, 1970)

The revision covered editorial changes and clarification of the method used, especially with pitch.

D 2569 - 70 (formerly D 2569 - 69), Distillation of Pitch (Subcommittee D-8.17) (effective Aug. 14, 1970)

The precision statement was revised to include repeatability and reproducibility values obtained by round-robin tests.

Adoption of Tentative Revision as Standard:

D 41 - 70 (formerly D 41 - 41), Specification for Primer for Use with Asphalt in Damp-proofing and Waterproofing (Subcommittee D-8.05) (effective July 15, 1970)

D 146 - 70 (formerly D 146 - 65), Method of Sampling and Testing Felted and Woven Fabrics Saturated with Bituminous Substances for Use in Waterproofing and Roofing (Subcommittee D-8.04) (effective July 15, 1970)

D 1079 - 70 (formerly D 1079 - 66), Definitions of Terms Relating to Bituminous and Other Organic Materials for Roofing, Waterproofing, and Related Building and Industrial Uses (Subcommittee D-8.01) (effective July 15, 1970)

D 1226 - 70 (formerly D 1226 - 64), Specification for Asphalt Insulating Siding Surfaced with Mineral Granules (Subcommittee D-8.02) (effective July 15, 1970)

The new and revised standards accepted effective in 1969 appear in the 1970 *Annual Book of ASTM Standards*, Part 11. Those effective in 1970 will appear in the 1971 *Annual Book of ASTM Standards*, Part 11.

AMERICAN NATIONAL STANDARDS

The following standards have been approved during the year as American National Standards by the American National Standards Institute:

D 61 - 68, ANSI A37.36-1969 Method of Test for Softening Point of Pitch (Cube-In-Water Method)

D 173 - 68, ANSI A109.12-1969, Standard Specifications for Woven Cotton Fabrics Saturated With Bituminous Substances for Use in Waterproofing

D 224 - 68, ANSI A109.19-1969 Standard Specifications for Asphalt Roll Roofing Surfaced with Powdered Talc or Mica

D 226 - 68, ANSI A109.2-1970, Specification for Asphalt-Saturated Roofing Felt for Use in Waterproofing and in Constructing Built-Up Roofs

D 228 - 69, ANSI A109.30-1970, Method of Testing Asphalt Roll Roofing, Cap Sheets, and Shingles

D 249 - 68, ANSI A109.21-1969 Standard Specifications for Asphalt Roll Roofing Surfaced with Mineral Granules

D 250 - 68, ANSI A109.4-1969 Standard Specifications for Asphalt-Saturated Asbestos Felts for Use in Waterproofing and in Constructing Built-Up Roofs

D 1010 - 66, ANSI A149.1-1969 Methods of Testing Asphalt Emulsions for Use as Protective Coatings for Metal

D 1167 - 65, ANSI A149.2-1969 Methods of Testing Asphalt-Base Emulsions for Use as Protective Coatings for Built-up Roofs

D 1670 - 68, ANSI A109.41-1970, Method of Test for Failure Endpoint in Accelerated and Outdoor Weathering of Bituminous Materials

D 2314 - 65, ANSI A149.3-1969 Methods of Testing Homogeneous Bituminized Fiber Pipe

D 2315 - 65, ANSI A149.4-1969 Methods of Physical Testing of Laminated-Wall Bituminized Fiber Pipe

D 2317 - 66, ANSI A149.5-1969 Method of Test for Benzene-Insoluble (BI) Content of Tar and Pitch

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- D 2318 - 66**, ANSI A149.6-1969 Method of Test for Quinoline-Insoluble (QI) Content of Tar and Pitch
- D 2319 - 66**, ANSI A149.7-1969 Method of Test for Softening Point of Pitches (Cube-In-Air Method)
- D 2320 - 66**, ANSI A149.8-1969 Method of Test for Specific Gravity of Solid Pitch (Pycnometer Method)
- D 2415 - 66**, ANSI A149.9-1969 Method of Test for Ash in Coal Tars and Pitches
- D 2416 - 68**, ANSI A149.12-1969 Method of Test for Coking Value of Tar and Pitch (Modified Conradson)
- D 2569 - 69**, ANSI A149.10-1970 Method of Test for Distillation of Pitch

ACTIVITIES OF SUBCOMMITTEES

Subcommittee D-8.01 on Nomenclature, Definitions and Editorial (J. W. Donegan, chairman)—Eleven tentative revisions to Definitions D 1079, Terms Relating to Bituminous and Other Organic Materials for Roofing, Waterproofing and Related Building or Industrial Uses, which have stood since 1965 were approved as standard. A new definition for "bitumen" which better satisfies the needs of Committee D-8 is being studied. An editorial change in the definition of "mineral stabilizer" in order to conform with sieve size requirements of Method D 228, Testing Asphalt Roll Roofing, Cap Sheets, and Shingles, will be proposed at the June 1970 meeting.

Subcommittee D-8.09 on Bituminous Emulsions (P. E. McCoy, chairman)—In June 1968, A. Hoiberg pointed out the advantages of combining the following existing ASTM Methods into one method: D 1010, Testing Asphalt Emulsions for Use as Protective Coatings for Metal, D 466, Testing Films Deposited from Bituminous Emulsions, and D 1167, Testing Asphalt-Base Emulsions for Use as Protective Coatings for Built-up Roofs. The members of the subcommittee, the Executive Committee, and ASTM's headquarters representative favored this consolidation because of the duplication and many similarities in procedures of these methods.

In July 1969, Subcommittee D-8.09's Task Force C reviewed and approved their fourth draft of the Method of Testing Bituminous-Base Emulsions for Use as Protec-

tive Coatings (Joint D 1010/D 1167). It received letter ballot approval of Subcommittee D-8.09 and is now out for letter ballot approval of Committee D-8.

Subcommittee D-8.09's Task Force D has developed and established the reliability through round-robin tests of a method for measuring the consistency (flow properties) of clay emulsions. The method is under letter ballot of the subcommittee for approval as a standard.

Work is underway on a quantitative method of measuring the effect of water action on cured clay emulsion coatings.

Subcommittee D-8.09 has, with the approval of its members, received clearance from the Executive Committee to develop a specification for coal tar emulsions. This is presently under preparation.

As miscellaneous activities, Subcommittee D-8.09, has (1) incorporated metric equivalents in all methods and specifications under its jurisdiction, (2) policed, edited, and revised these standards where necessary, and (3) conducted engineering studies on the fundamental characteristics of products related to its activities.

Subcommittee D-8.16 on Bituminized Fibre Pipe (H. L. Stasse, chairman) is presently working on a new standard for underground transformer vaults, and at the next meeting will discuss feasibility of an additional separate standard for bituminized fiber pipe fittings.

Subcommittee D-8.17 on Industrial Pitches (C. U. Pittman, chairman)—A round robin to provide up-to-date precision statements for Methods D 2318 - 66, D 2415 - 66, and D 2764 - 68 T is in progress. A new softening point apparatus which appears to improve the precision of the determination is under study. Recommended practices to be used in case of dispute between supplier and consumer on tests having relatively poor precision are under review.

Subcommittee D-8.18 on Nonbituminous Organic Roof Coverings (W. C. Cullen, chairman) held two meetings during the year. The major goals set in previous years were the development of two performance specifications. One was directed toward a specification for liquid-applied, nonbituminous roof covering; the other pertained to elastomeric and plastomeric sheet roof covering. A task

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group, under the direction of N. F. Thomas, has taken on the job to revise the proposed specification which failed to be approved by the subcommittee with 16 affirmative, 6 negative votes.

Unfortunately, work on the proposed specification for elastomeric and plastomeric sheet roofing has been suspended at the direction of the subcommittee and the task group was disbanded. The task group, under the direction of D. Greason, presented the following reasons for recommending suspension:

Two of the four materials previously produced are no longer being manufactured,

The products are proprietary, and

There could be no standardization since the products differed so widely in make-up and physical characteristics.

Subcommittee D-8.19 on Canal, Ditch, and Pond Lining (L. C. Haack, chairman) is concerned with the specifying of organic linings for canals, ditches, and ponds and developing recommended practices for their installation. Such linings are very useful in preventing the seepage of water into soil in the development of new canals and reservoirs, also in rehabilitating old reservoirs. These linings are useful not only in preventing the loss of fresh water for drinking, irrigation, and other useful purposes, but also lining ponds to prevent industrial water such as brine from the oil fields and other contaminated water from leaching into the ground and poisoning the soil or contaminating fresh water supplies.

Specifications have been prepared for asphaltic preformed slabs for use as an exposed lining. Work is being done on developing a

recommended practice for installation of such linings. Also a specification for asphalt linings has been adopted as a standard. A task force is working on the development of a specification for hot-mix asphalt concrete for use in formed-in-place linings. This task force has been working on this project for some time, and their work should be near completion.

The subcommittee also has a task force which is divided into subgroups working on the preparation of specifications for elastomeric liners and plastic liners. The section of the task force developing a specification for the plastic-type lining has just about completed their work and it is supposed to present a specification to the subcommittee for review before the annual meeting. The group working on the rubberized or elastomeric type materials are still working to develop a standard for this type of material.

Subcommittee D-8.20 on Nonstructural Roof Systems (W. H. Gumpertz, chairman) has completed work on ASTM Recommended Practice D 2829 - 69 T, for Sampling and Analysis of Built-up Roofs." A task group is now reviewing proposals for modifications and additions to this standard, including provisions for separating felt plies by freezing.

The subcommittee is also reviewing other technical information pertinent to the knowledge of nonstructural roofing systems.

Respectfully submitted on behalf of the committee,

P. M. JONES,
Chairman

C. R. LEA,
Secretary

REPORT OF COMMITTEE

D-9 ON ELECTRICAL INSULATING MATERIALS

Committee D-9 on Electrical Insulating Materials held three meetings during the year: in Atlantic City, N. J., June 25, 26, 27, 1969; in Detroit, Mich., Oct. 27, 28, 29, 1969, and in Cincinnati, Ohio, March 4, 5, 6, 1970. Two symposiums were held during the year: in Detroit, Mich., October 28, 1969, on Temperature Effects on the D-C Insulation Conductance Properties, and in Cincinnati, Ohio, March 5, 1970, on Corona: Glow, Pseudo-Glow, and Pulse-Type Discharges. As of Jan. 30, 1970, there were 358 members, of whom 204 were classified as voting members; 84 as producers, 68 as consumers, and 46 as general interest. The committee has 47 consulting members and 9 honorary members.

Cooperation by Committee D-9 continues with the International Electrotechnical Commission (IEC), the International Organization for Standardization (ISO), the Institute of Electrical and Electronic Engineers (IEEE), the Electronic Industries Association (EIA), and the National Electrical Manufacturers Association (NEMA). The Department of Defense has sent several documents to Committee D-9 for its review. This is a continuing cooperation with the Department of Defense to review military specifications that pertain to electrical insulation materials.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee D-9 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which were accepted by the Society effective on the dates indicated:

New Standards:

D 2258 - 70, Method of Test for Thermal Conductivity of Electrical Grade Mag-

nesium Oxide (Subcommittee XIV) (effective Feb. 27, 1970)

This method of test covers the determination of thermal conductivity of compacted, granular, electrical grade magnesium oxide (MgO) under conditions that simulate the use of this material as insulation in tubular heating units.

D 2861 - 70, Methods of Testing Composites of Copper Foil with Dielectric Films or Treated Fabrics (Subcommittee XIII) (effective March 19, 1970)

These methods cover procedures for testing flexible materials consisting of copper foil combined with either dielectric film or with treated or impregnated fabric to form flexible composites used in the manufacturing of flexible or multi-layer circuitry or both.

D 2865 - 70, Recommended Practices for Calibration of Standards and Equipment (Subcommittee XII) (effective May 29, 1970)

These proposals include calibration intervals, laboratory conditions, and uncertainty criteria for calibration standards and equipment being calibrated. The practices define and clarify calibration procedures and documentation on test equipment which should be helpful in establishing the limits and tolerances for acceptance or rejection of materials being judged for conformance to commercial, government, or military specifications.

Adoption of Tentatives as Standards Without Revision:

D 2302 - 69 (formerly D 2302 - 64 T), Method of Test for Differential Wet Tracking Resistance of Electrical Insulating Materials with Controlled Water-to-

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Metal Discharges (Subcommittee XII) (effective July 18, 1969)

- D 2400 - 70** (formerly D 2400 - 67 T), Specifications for Black and Yellow Varnished Glass-Polyester Cloth and Tape (Subcommittee VII) (effective Feb. 27, 1970)

Adoption of Tentatives as Standards with Revision:

- D 2442 - 70** (formerly D 2442 - 65 T), Specifications for Alumina Ceramics for Electrical and Electronic Applications (Subcommittee V) (effective May 8, 1970)

Revised to meet current needs of the electronic industry, including in the Appendix new test methods not previously published in ASTM standards.

- D 2520 - 70** (formerly D 2520 - 66 T), Method of Test for Complex Permittivity (Dielectric Constant) of Solid Electrical Insulating Materials at Microwave Frequencies and Temperatures to 1650 C (Subcommittee XII and V) (effective March 19, 1970)

Addition of a new Method B, the Resonant Cavity Perturbation Method.

Revision of Standards, Immediate Adoption:

- D 202 - 70** (formerly D 202 - 69), Methods of Sampling and Testing Untreated Paper Used for Electrical Insulation (Subcommittee VIII) (effective March 19, 1970)

Addition of a significance statement for conducting paths.

- D 295 - 70** (formerly D 295 - 65), Methods of Testing Varnished Cotton Fabrics and Cotton Fabric Tapes Used for Electrical Insulation (Subcommittee VII) (effective Feb. 27, 1970)

Addition of straight-cut materials.

- D 350 - 70** (formerly D 350 - 68), Methods of Testing Flexible Treated Sleeving Used for Electrical Insulation (Subcommittee VII) (effective March 19, 1970)

Revised to clarify wording and to bring into line with current practices.

- D 372 - 70** (formerly D 372 - 68) Specification for Flexible Treated Sleeving Used for Electrical Insulation (Subcommittee VII) (effective March 19, 1970)

Revised to improve wording and to bring into line with current practices.

- D 495 - 70** (formerly D 495 - 61), Method of Test for High-Voltage, Low-Current Arc Resistance of Solid Electrical Insulating Materials (Subcommittee XII) (effective May 8, 1970)

The scope and significance were revised to better define the purpose of the method, and warn users of the inherent variability in the results. Stainless steel electrodes were added as an improvement in the test procedure.

- D 617 - 70** (formerly D 617 - 44 (1967)), Method of Test for Punching Quality of Phenolic Laminated Sheets (Subcommittee III) (effective Feb. 27, 1970)

Addition of footnote to reference the German Punchability Rating System DIN 53488.

- D 902 - 69** (formerly D 902 - 62 (1967)), Methods of Testing Flexible Resin Coated Fabrics and Glass Fabric Tape Used for Electrical Insulation (Subcommittee VII) (effective April 25, 1969)

Revised to include a method for determination of isothermal weight loss of coated glass fabrics.

- D 1000 - 70** (formerly D 1000 - 69), Methods of Testing Pressure-Sensitive Adhesive Coated Tapes Used for Electrical Insulation (Subcommittee VII) (effective Feb. 27, 1970)

Addition of a method for Low-Temperature Elongation of Class 2 Tapes.

- D 1000 - 70a** (formerly D 1000 - 70), Methods of Testing Pressure-Sensitive Adhesive Coated Tapes Used for Electrical Insulation (Subcommittee VII) (effective March 19, 1970)

Revised section dealing with breaking strength, unwind force, and elongation of lacing tapes.

- D 1080 - 70** (formerly D 1080 - 61), Specification for Absorbent Laminating Paper for Electrical Insulation (Subcommittee VIII) (effective March 19, 1970)

Revised to bring the specification into line with current practices.

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D 1676 - 70 (formerly D 1676 - 68), Methods for Testing Film-Insulated Magnet Wire (Subcommittee X) (effective April 13, 1970)

Revised to improve method and bring it in line with current practices.

D 1711 - 70 (formerly D 1711 - 69), Definitions of Terms Relating to Electrical Insulation (Subcommittee XI) (effective March 6, 1970)

Ten definitions deleted, being replaced by ten other definitions.

D 1930 - 70 (formerly D 1930 - 67), Specification for Kraft Dielectric Tissue, Capacitor Grade (Subcommittee VIII) (effective March 19, 1970)

Addition of a table of values limiting the stain test characteristic for kraft dielectric tissue.

D 2568 - 70 (formerly D 2568 - 68), Recommended Practice for Calculation of Absorbed Dose from Gamma Radiation (Subcommittee XX) (effective Feb. 27, 1970)

Wording of scope changed to clarify the energy range and caution on the effect of absorbent between radiation source and specimen.

Reapproval of Standards:

D 149 - 64 (1970), Tests for Dielectric Breakdown Voltage and Dielectric Strength of Electrical Insulating Materials at Commercial Power Frequencies (Subcommittee XII)

D 879 - 62 (1970), Specification for Communication and Signal Pin-Type Lime-Glass Insulators (Subcommittee V)

D 1531 - 62 (1970), Test for Dielectric Constant and Dissipation Factor of Polyethylene by Liquid Displacement Procedure (Subcommittee XII)

D 1671 - 63 (1970), Method of Test for Absorbed Gamma Radiation Dose in the Fricke Dosimeter (Subcommittee XX)

The new and revised standards D 2568, D 2865, D 2400, D 295, D 617, and D 1000 will appear in the 1971 *Annual Book of ASTM Standards*, Part 29. All other standards appear in the 1970 edition.

ANSI STANDARDS

The following standards have been approved during the year as American National Standards by the American National Standards Institute:

D 115 - 68; ANSI C59.30-1969, Methods of Testing Varnishes Used for Electrical Insulation

D 348 - 68; ANSI C59.14-1969, Methods of Testing Laminated Tubes Used for Electrical Insulation

D 349 - 68; ANSI C59.15-1969, Methods of Testing Laminated Round Rods Used for Electrical Insulation

D 709 - 67; ANSI C59.16-1969, Specifications for Laminated Thermosetting Materials

D 1202 - 68; ANSI C59.87-1969, Specifications for Plasticized Cellulose Acetate Sheet and Film for Primary Insulation

D 1346 - 68; ANSI C59.36-1969, Methods for Testing Electrical Insulating Varnishes for 180 C and Above

D 1371 - 68; ANSI C59.80-1969, Recommended Practices for Cleaning Plastic Specimens for Insulation Resistance, Surface Resistance, and Volume Resistance Testing

D 1458 - 68; ANSI C59.99-1969, Methods of Testing Fully Cured Silicone Rubber-Coated Glass Fabric and Tapes for Electrical Insulation

D 1676 - 68; ANSI C59.88-1969, Methods of Testing Film-Insulated Magnet Wire

D 1830 - 68; ANSI C59.86-1969, Method of Test for Thermal Stability of Electrical Insulating Coated Fabrics

D 1931 - 68; ANSI C59.89-1969, Specifications for Fully Cured Silicone Rubber-Coated Glass Fabric and Tapes for Electrical Insulation

D 1932 - 67; ANSI C59.90-1969, Method of Test for Thermal Endurance of Flexible Electrical Insulating Varnishes

D 2301 - 68; ANSI C59.91-1969, Specifications for Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape

D 2305 - 68; ANSI C59.92-1969, Methods of Testing Polymeric Films Used for Electrical Insulation

D 2307 - 68; ANSI C59.93-1969, Method of Test for Relative Thermal Endurance of Film-Insulated Round Magnet Wire

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- D 2381 - 68;** ANSI C59.94-1969, Methods for Testing Flexible Composite Materials Used for Electrical Insulation
- D 2443 - 68;** ANSI C59.95-1969, Methods for Testing Lacing Twines and Tapes Used as Harnesses in Electrical Equipment
- D 2484 - 68;** ANSI C59.96-1969, Specifications for Polyester Film Pressure-Sensitive Electrical Insulating Tape
- D 2518 - 68;** ANSI C59.97-1969, Specifications for Woven Glass Fabrics for Electrical Insulation
- D 2519 - 68;** ANSI C59.98-1969, Method of Test for Bond Strength of Electrical Insulating Varnishes by the Helical Coil Test

ACTIVITIES OF SUBCOMMITTEES

Subcommittee I on Insulating Varnishes, Paints, and Lacquers (W. E. Harvey, chairman) has been working on developing test methods for unsaturated polyesters (solventless varnishes) such as percent monomer content, viscosity, gel time, linear shrinkage, weight loss, and compatibility.

In the field of solvent-containing varnishes the subcommittee is working on modifications of Method D 2307, the Helical Coil Method D 2519, and the deflected beam test. It is hoped that with these and the weight loss test, we can better thermally evaluate coatings.

The subcommittee is also balloting a method of test for cut-through of a powdered-resin film. A specification for the general test methods for powdered resins is also ready for section letter ballot.

Subcommittee III on Plates, Tubes, Rods, and Molded Materials (Guy W. Beane, chairman)—The proposed addition of Hot Rockwell Hardness and Acetone Extractable Matter Test in Method D 229 has been sent on to Subcommittee XI for letter ballot prior to going to D-9 ballot.

For 1970, the subcommittee is working on revisions of Method D 619 and Specification D 710 to modify the Rockwell Hardness procedure. The subcommittee also plans revisions in Specification D 1867 to include the Hot Oil Peel Test for copper bond to laminates.

All section meetings have been discontinued. Their business will be conducted at the subcommittee meetings.

Subcommittee IV on Measurement of Die-

lectric Properties of Materials Under Simulated Space and Cryogenic Conditions—There has been no activity within Subcommittee IV. Committee D-9 officials are currently attempting to reorganize the subcommittee, but no decisions have been reached to date.

Subcommittee V on Ceramic Products (D. D. Briggs, chairman) is currently revising Method D 116 - 69, Testing Vitrified Ceramic Materials for Electrical Applications, and balloting on whether to recommend for adoption as standard without revision Specification D 2757 - 68 T, Impervious Steatite Ceramics for Electrical and Electronic Applications.

Future plans call for a complete revision of Specification D 879 - 62, Communication and Signal Pin-Type Lime-Glass Insulators, with primary aim of removing any test methods contained therein for submittal as individual methods.

Subcommittee VI on Solid Filling, Treating, Encapsulating, and Embedding Compounds (J. P. Hornburg, chairman) will undertake to write a companion standard to Method D 1674, Testing Polymerizable Embedding Compounds Used for Electrical Insulation. Method D 1674, to which a thermal-mechanical method for determination of thermal coefficient of expansion is being added, is restricted to compounds which must cure without pressure. The new standard will be for transfer molding compounds.

A standard for the test of silicone greases used as electrical insulating material will be developed.

Subcommittee VII on Flexible Sheet, Tape, and Tubes (H. G. Steffens, chairman)—Revisions in both methods of testing and specifications for treated sleeving are in progress. Specifications have been drafted for neoprene, fluorocarbon, and silicone rubber heat-shrinkable tubings. Work is continuing on methods for determining flammability, fungus resistance, and storage stability of lacing tapes and twines, and on specifications for these materials. Methods are being developed for testing B-staged coated fabrics, and interlaboratory work is continuing on evaluation of a design for determining dielectric breakdown voltage of coated glass cloth at elevated temperatures. A broad program

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for investigation of suitable methods of evaluating low-temperature properties of vinyl adhesive tapes is in progress. Methods for determining flammability, and effects of moisture on vinyl adhesive tapes are also under study. Work is progressing on methods for determining adhesive tapes at elevated temperature. Interlaboratory work continues on the use of two-fluid methods for determining dielectric-loss properties of thin films. Studies are now being proposed for evaluating corrosive effect of dielectric films, and the measurement of penetration temperatures of various types of film.

Subcommittee VIII on Insulating Papers (C. E. Cashman, chairman)—Successful passage of a major revision of Specification D 1080, for Absorbent Laminating Paper for Electrical Insulation, through section, subcommittee, and D-9 ballots marked the near conclusion of a project, initiated in 1962, to incorporate into the specification the several types of paper actually used for the purpose. Other advances, with the exception of the addition of stain-test limits for capacitor tissues to Specification D 1930, were largely editorial: addition of significance statements, report sections, and metric equivalents.

Substantial questions as to better ways to evaluate heat stability, conducting particles, and particulate iron in paper were vigorously discussed without discernible progress. The discontinuance of D 987 Stretch of Paper Products Under Tension, a Committee D-6 method, from the 1969 *Book of ASTM Standards*, aroused concern since it was the basis of the Stretch at Rupture Test in Methods D 202, Sampling and Testing Untreated Paper Used for Electrical Insulation.

Subcommittee IX on Mica Products (J. K. Noll, chairman) with the help of Subcommittee XI is preparing two methods concerning mica films for ballot of Committee D-9.

Subcommittee IX is also doing preliminary work on revision of Method D 352 Testing of Pasted Mica Used in Electrical Insulation; the study of the NEMA method for determining undersize mica splittings; and the preparation of a new specification for Spooled Tape Tightness, which may be applicable to other materials as well as mica tape.

Subcommittee X on Magnet Wire Insulation (R. B. Young, chairman) is writing test

methods for magnet wire, round, shaped, and fabric-covered. Eight methods were fully or partially completed during 1969.

Subcommittee XI on Nomenclature, Significance, and Statistics (L. J. Timm, chairman) continues to serve as an editorial review group to all D-9 subcommittees on scope statements, significances, definitions, and report sections. Further assistance is extended to the new subcommittees to assure conformance of newly written methods to the recommendations on form of standards. Work is proceeding on the project to incorporate all D-9 definitions in D 1711, Definitions of Terms Relating to Electrical Insulation.

Subcommittee XII on Electrical Tests (J. N. Jones, chairman) is actively working on the Recommended Practices on Calibration to be used on instruments used in evaluating insulations. Current work is in progress concerning electrostatic in vital areas under a range of conditions such as hospital rooms, etc. We are deeply involved in arc-resistance evaluations. The work includes revising existing methods such as D 495 - 61 to develop new techniques (such as the revolving wheel). A very active group is busy writing a method for evaluating insulation thickness. No adequate method was available, so the subcommittee is preparing a method to cover all pertinent insulations.

Resistivity, loss, and dielectric strength at elevated temperatures are being reviewed and methods developed. Corona resistance seems to be of current interest. We invite your participation.

Subcommittee XIII on Flexible Composite Insulating Materials (G. R. Traut, chairman)—Subcommittee XIII activities, current and planned, for 1970 are round-robin testing using the cuff-tear test method for later inclusion in Method D 2381, Test for Flexible Composite Materials Used for Electrical Insulation, and the investigation of methods for testing insulation resistance of etched patterns for inclusion in the new methods of Test for Flexible Composites of Copper Foil with Dielectric Films or Treated Fabrics.

Subcommittee XIV on Electric Heating Unit Insulation (Norman Hill, chairman) has just completed action on an accelerated life test for heating elements insulated with magnesium oxide insulation. This test has passed

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through the subcommittee and is now in the process of being validated by Committee D-9, for immediate adoption as standard.

The committee's activities now center around the development of a sinter method, and such a method is now being validated within the subcommittee and Subcommittee XI. It is expected that action on this method will be taken at the March meeting.

As far as new activity is concerned, the subject of flow and fill density of magnesium oxide as it relates to the insulation of electric heaters is now in the testing stage with a round robin currently in process, evaluating the repeatability of one method commonly used in the heating element industry. Other methods are being weighed and existing ASTM methods that relate to these same subjects are being looked at by the subcommittee.

Subcommittee XV on Research and Technical Papers (E. J. McMahon, chairman) plans to continue to generate symposia on timely subjects. As an example, at the Spring Meeting in March a symposium was presented on Corona under the title *Corona, Glow, Pseudo-Glow, and Pulse Type Discharges*. In the fall of 1970 the subcommittee hopes to hold a symposium on Dielectric Breakdown Under D-C Conditions. Measurements at 60 Hz, high frequencies (for example 100 MHz), and high temperatures may be considered for a near future symposia.

Subcommittee XVI on Hook-up Wire Insulation (L. J. Frisco, chairman)—During the year, Subcommittee XVI has been concentrating on scope and test methods. To date, the following test methods have been discussed and balloted in the subcommittee: Voltage Withstand, Surface Resistance, In-

sulation Resistance, and Voltage Breakdown.

These test methods, together with the scope, are presently being balloted in the subcommittee and also in Subcommittee XI. They are expected to be ready for Committee D-9 ballot early this year.

A test method for the measurement of dissipation factor and capacitance of hook-up wire insulation is currently being discussed in the subcommittee. Other methods are being prepared for discussion.

It is the plan of the subcommittee to continue these activities until a substantial number of methods covering all phases of hook-up wire testing are ready for publication. An effort is also being made to attract more user participation in the activities of the subcommittee.

Subcommittee XX (joint with Committee D-20) on Effects of Nuclear and High-Energy Radiation (Oscar Sisman, chairman) has drafted a classification system for polymeric materials for service in ionizing radiation. This document will be prepared for letter ballot during the coming year. Three new methods for gamma dosimetry are nearly ready for subcommittee letter ballot: a ferrous copper sulfate method, a seric sulfate method, and one employing Perspex plastic. A glass dosimetry method and a method using radiochromic-dye systems are being readied for round-robin testing. Section .05 is studying methods for monitoring gamma radiation in the presence of neutrons.

Respectfully submitted on behalf of the committee,

R. W. ORR,
Chairman

C. F. ACKERMAN,
Secretary

REPORT OF COMMITTEE D-10 ON PACKAGING

Committee D-10 on Packaging held its annual meeting in Philadelphia, Pa., on Jan. 27, 1970, following a full day devoted to working sessions of the various divisions, committees, and subcommittees. A number of amendments to the bylaws of D-10 were proposed, subsequently approved by letter ballot, including a return to a two meetings per year schedule.

The committee has 135 voting members representing 48 producers, 54 consumers, and 33 general interest members.

K. Q. Kellicutt was elected to honorary membership in D-10, in recognition of many years of devoted service to the committee.

Officers elected for the ensuing two-year term are:

Chairman, W. L. Newman

Secretary, R. K. Stern

Vice-Chairmen;

Division I, H. W. Maas, Jr.

Division II, R. S. Kurtenacker

Division III, D. E. Barnes

Steering Committee, G. E. Falkenau

Members-at-Large;

Division I, M. J. Clark

Division II, J. T. Hubbard

Division III, J. C. Jankowski

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee D-10 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which were accepted by the Society effective on the dates indicated:

New Standard:

D 2860 - 70, Method of Test for Adhesion of Pressure-Sensitive Tape to Fiberboard at 90 Degree Angle and Constant Stress

(Subcommittee I-4) (effective March 19, 1970)

This method includes two related but independent procedures for determining the property of adhesion of pressure-sensitive tape to a fiberboard surface. The user of this method must choose the specific fiberboard surface for the test. The user may choose a linerboard or other paper to represent the fiberboard surface.

The new standard will appear in the 1971 *Annual Book of ASTM Standards*, Part 15.

ACTIVITIES OF DIVISIONS

Division I, General (H. W. Maas, Jr., chairman)—One method related to tape testing has been completed (D 2860). Other areas are being explored. Activity continues on fragility assessment.

Division II, Shipping Containers (R. S. Kurtenacker, chairman)—A number of exploratory studies continue on shock and vibration environment, ambient atmospheric conditions, and controlled input shock testing. The Method of Test for Thermal Insulation of Packages was resubmitted for letter ballot, and work should be completed by the end of this year.

Division III, Consumer Packages (D. E. Barnes, chairman)—Thirteen test methods relating to fiber cans are now in process of letter ballot by D-10. Studies continue on test methods for aerosols, flexible pouches, blister packs, and torque retention of closures.

Respectfully submitted on behalf of the committee,

J. W. GOFF,
Chairman

R. F. UNCLES,
Secretary

REPORT OF COMMITTEE D-11 ON RUBBER AND RUBBER-LIKE MATERIALS

Committee D-11 on Rubber and Rubber-Like Materials met twice during the year: on June 25 to 27, 1969, in Atlantic City, N. J., and on Dec. 9 to 12, 1969, in Cincinnati, Ohio. The SAE-ASTM Technical Committee on Automotive Rubber met concurrently with Committee D-11 in Cincinnati.

The committee consists of 268 voting members, of whom 97 are classified as producers, 56 as consumers, and 115 as general interest members.

At the June 1969 meeting, R. H. Moul, Koppers Co., Inc., presented a talk on New Method for Temperature Control in the H-Test. Mr. Moul spoke about a temperature-controlled specimen feeding device developed to facilitate measuring the adherence of tire cords to rubber. The technical presentation made during the Cincinnati meeting involved a review by L. G. Mason, retiring chairman of Subcommittee D-11.22, Natural Rubber, of the subcommittee's activities dating back to when his predecessor, Norman Bekkedahl, served as chairman. Included in this program was the showing of two films: one entitled "Standard Malaysian Rubber" prepared for the Natural Rubber Bureau, and the other taken by N. P. Bekema, Uniroyal. The latter illustrated Far East rubber plantation operations.

During the past year Certificates of Appreciation were presented to two individuals who had faithfully served the committee. In May 1969 Ross Shearer, B. F. Goodrich Research Center (retired), was so honored, and at the Cincinnati meeting a similar presentation was made to L. G. Mason. Mr. Mason retired from B. F. Goodrich Co. in May 1970.

The following honors were accorded members of Committee D-11 during the ASTM Awards Luncheon which took place in Atlantic City: (1) A certificate in recognition

of 50 years' continuous membership was presented to Elmer E. Eakins (Mr. Eakins was formerly associated with the Laminar Corp.), (2) An Award of Merit was given to Joseph F. Kerscher, (3) G. C. Maassen accepted in behalf of the R. T. Vanderbilt Co. a certificate acknowledging 50 years' participation in the work of the Society.

The committee mourned the loss of one of its honorary members. John J. Allen, who for 30 years was associated with Committee D-11 and served as its secretary for six years (1956-1962), passed away suddenly on March 17, 1969.

A planning committee for the ISO/TC 45 meeting designated for Philadelphia in October 1971 under the direction of W. H. King, Acushnet Co., has been busy during the year. General plans for the meeting have been developed and are now being implemented.

The following changes in subcommittee leadership occurred during the year:

1. Mrs. W. H. Mees, Firestone Tire and Rubber Co., who previously served as secretary, took on the assignment of chairman of Subcommittee D-11.11, Chemical Analysis. Illness on the part of W. P. Tyler prompted this move. Dr. Tyler agreed to serve as secretary pro tem for the subcommittee.

2. A. G. Veith, B. F. Goodrich Research Center, former secretary of Subcommittee D-11.15, Life Tests, assumed the chairmanship of the subcommittee replacing R. T. Zimmerman, R. T. Vanderbilt Co. W. J. Mueller, Battelle Memorial Institute, was appointed secretary.

3. C. E. McCormick, Continental Carbon Co., was approved as secretary of Subcommittee D-11.16, Statistical Quality Control.

4. W. J. Holley, The Goodyear Tire and Rubber Co., replaced A. G. Veith, B. F. Goodrich Research Center, as chairman of Subcommittee D-11.20, Compounding Materials and Procedures.

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5. N. P. Bekema, Uniroyal, former secretary of Subcommittee D-11.22, Natural Rubber, assumed the chairmanship.

6. J. F. Nelson, Raybestos-Manhattan, Inc., through a change in assignment in his company, had to resign the secretaryship of Subcommittee D-11.32, Belting.

7. SAE-ASTM Technical Committee on Automotive Rubber elected the following officers:

Chairman, E. F. Moorman, International Harvester.

Vice-Chairman, C. S. Coddington, Gates Rubber Co.

Secretary, Howard Foell, Firestone Industrial Products Div.

The Committee D-11 officers elected for the ensuing two-year term are:

Chairman, G. C. Maassen.

Vice-Chairman, W. H. King.

Secretary, J. F. Kersch.

Executive Committee: W. H. Bryan, E. S. Conant, E. G. Driscoll, R. W. Jones, R. D. Stiehler, J. F. Svetlik, and A. G. Veith.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee D-11 submitted the following recommendations to the Society for action under the Interim Procedure for Standards which were accepted effective on the dates indicated:

New Standards:

D 2802 - 70, Specification for Ozone Resistant Ethylene-Propylene Rubber Insulation (Subcommittee D-11.35) (effective April 13, 1970)

This specification covers an ozone-resistant vulcanized rubber insulation for electrical wires and cables. The rubber hydrocarbon component of the insulation consists substantially of ethylene-propylene rubbers (both EPM and EPDM).

Adoption of Tentatives as Standards Without Revision:

D 2228 - 69 (formerly D 2228 - 63 T), Test for Abrasion Resistance of Rubber and Elastomeric Materials by the Pico Method (Subcommittee D-11.15) (effective May 30, 1969)

D 2708 - 70 (formerly D 2708 - 68 T), Specification for Extra-Heavy-Duty Acrylonitrile-Butadiene/Poly(Vinyl Chloride) (NBR/PVC) Jacket for Wire and Cable (Subcommittee D-11.35) (effective April 13, 1970)

Adoption of Tentatives as Standards with Revisions:

D 2655 - 70 (formerly D 2655 - 67 T), Specification for Crosslinked Thermosetting Polyethylene Insulation for Wire and Cable Rated 0 to 600 V (Subcommittee D-11.35) (effective April 13, 1970)

Changes were made to adapt this specification to the current requirements of the electrical industry.

D 2656 - 70 (formerly D 2656 - 67 T), Specification for Crosslinked Thermosetting Polyethylene Insulation for Wire and Cable Rated 601 to 15,000 V (Subcommittee D-11.35) (effective April 13, 1970)

Similar changes were made to this specification as for the preceding one. Likewise, the purpose was to make it conform to electrical industry's current requirements.

Revision of Standards:

D 15 - 70 (formerly D 15 - 68a), Methods of Sample Preparation for Physical Testing of Rubber Products (Subcommittee D-11.20) (effective Sept. 19, 1969 and April 13, 1970)

The revision accepted Sept. 19, 1969, dealt with a change in the rest period for all recipes prior to the determination of the various physical properties.

Subsequent to the above submittal, several other revisions have been advanced. These involved: (1) test recipe for synthetic polyisoprene, (2) new formulas and a method of test for several types of non-black SBRs, (3) change of carbon black drying procedure, (4) elimination of remill procedure plus a change in the mixed compound conditioning, and (5) increase in time for carbon black and oil addition steps in the polybutadiene (BR) mixing procedure, Method C-mill.

D 378 - 70 (formerly D 378 - 60), Methods of Testing Flat Rubber Belting (Subcommittee D-11.32) (effective June 12, 1970)

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The revision reflects changes in material and methods of testing since 1960. Further, there was an over-all updating to conform to the present day format.

D 380 - 70 (formerly D 380 - 65), Methods of Testing Rubber Hose (Subcommittee D-11.31) (effective June 25, 1970)

Changes were made in that portion of the method dealing with immersion tests for change in volume and deterioration of hose used for petroleum products (Sections 20 to 24 inclusive). A major revision dealt with deleting duplication in this method and method D 471 by cross-referencing applicable sections of the latter. A second major alteration pertained to specifying the use of the original cross-sectional area in place of the swollen area as a base for calculating deterioration.

D 1048 - 70 (formerly D 1048 - 59 (1965)), Specifications for Rubber Insulating Blankets (Subcommittee D-11.34) (effective April 13, 1970)

The specification was modified to provide for d-c electrical testing in addition to a-c electrical tests. The standard was also expanded to include requirements for insulating blankets made of isoprene rubbers (both synthetic and natural) with and without reinforcement.

D 1351 - 70 (formerly D 1351 - 67), Specification for Polyethylene Insulated Wire and Cable (Subcommittee D-11.35) (effective April 13, 1970)

The specification was revised to be consistent with acceptable present day quality.

D 1352 - 70 (formerly D 1352 - 60 (1968)), Specification for Ozone-Resisting Butyl Rubber Insulation for Wire and Cable (Subcommittee D-11.35) (effective April 13, 1970)

To bring the specification in line with the current industry practice, two paragraphs were deleted. The paragraphs involved were: 3(d) Double A-C Voltage Test on Short Specimens and 3(f) Cold-Bend, Long-Time Voltage Test on Short Specimens.

D 1416 - 70 (formerly D 1416 - 69), Methods for Chemical Analysis of Synthetic

Elastomers (Solid Styrene-Butadiene Copolymers) (Subcommittee D-11.11) (effective April 13, 1970)

Two extensive modifications to the method were made. The first involved the addition of a second more generally useful extracting solvent (H-ITM, hydrous isopropanol-toluene mixture). The second change dealt with adding a procedure for measuring quantitatively the presence of *p*-phenylenediamine stabilizer in raw SBR.

D 1565 - 70 (formerly D 1565 - 66), Specifications for Flexible Foams Made from Polymers or Copolymers of Vinyl Chloride (Subcommittee D-11.33) (effective April 13, 1970)

The specification required a complete revision to make it acceptable to the industry.

D 1566 - 70a (formerly D 1566 - 68a), Definitions of Terms Relating to Rubber and Rubber-Like Materials (Subcommittee D-11.08) (effective Oct. 3, 1969, Dec. 18, 1969, March 6, 1970, and April 13, 1970)

Definitions were added for Compounding Ingredients, Compounding Materials, Extender, Masterbatch, Mix, Set after Break, Tensile Set, and Ultimate Elongation.

D 2000 - 70 (formerly D 2000 - 68), Classification System for Elastomeric Materials for Automotive Applications (SAE-ASTM Technical Committee on Automotive Rubber) (effective April 13, 1970)

The changes made involved the addition of Suffix K11 values for specific grades of AA, BA, and BC materials and the addition of FE310 basic requirements and 5FE310 suffix requirements to the FE material table.

D 2231 - 70 (formerly D 2231 - 66), Recommended Practice for Forced Vibration Testing of Vulcanizates (Subcommittee D-11.14) (effective April 13, 1970)

A list of terms and definitions specific to forced vibration testing were added to this recommended practice. Such terms, it was agreed, would have more significance here than to include them in Definitions D 1566.

D 2769 - 70 (formerly D 2769 - 68), Method of Test for Extractable Material

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and Permeability of LP-Gas Hose (Subcommittee D-11.31) (effective April 13, 1970)

Alternatives were deemed necessary to improve and more clearly define the present method. Further such changes will bring about greater assurance that all extracted residue is removed and measured.

Reapproval of Standards:

D 624 - 54 (1970), Test for Tear Resistance of Vulcanized Rubber (Subcommittee D-11.10)

D 639 - 62 (1970), Testing Battery Containers Made from Hard Rubber or Equivalent Materials (Subcommittee D-11.10)

D 749 - 63 (1970), Calibrating a Light Source Used for Accelerating the Deterioration of Rubber (Subcommittee D-11.15)

D 1329 - 60 (1970), Evaluating Low-Temperature Characteristics of Rubber and Rubber-Like Materials by a Temperature Retraction Procedure (TR Test) (Subcommittee D-11.14)

D 1764 - 62 (1970), Specifications for Latex Dipped Goods for Coating for Automotive Applications (SAE-ASTM Technical Committee on Automotive Rubber)

ANSI STANDARDS

The following standards have been approved during the year as American National Standards by the American National Standards Institute:

D 15 - 69; ANSI J1.1-1970, Methods of Sample Preparation for Physical Testing of Rubber Products

D 412 - 68; ANSI J2.1-1969, Method of Tension Testing of Vulcanized Rubber

D 866 - 68; ANSI C8.28-1970, Specifications for Styrene-Butadiene (SBR) Synthetic Rubber Sheath for Wire and Cable

D 2219 - 68; ANSI C8.45-1970, Specifications for Vinyl Chloride Plastic Insulation for Wire and Cable, 60 C Operation

D 2220 - 68; ANSI C8.46-1970, Specifications for Vinyl Chloride Plastic Insulation for Wire and Cable, 75 C Operation

The following standards have been submitted to the American National Standards Institute for approval:

D 2655 - 70, Specification for Crosslinked Thermosetting Polyethylene Insulation for Wire and Cable Rated 0 to 2000 V

D 2656 - 70, Specification for Crosslinked Thermosetting Polyethylene Insulation for Wire and Cable Rated 2001 to 15,000 V

D 2708 - 69, Specification for Extra-Heavy-Duty Acrylonitrile-Butadiene/Poly(Vinyl Chloride) (NBR/PVC) Jacket for Wire and Cable

D 2802 - 69, Specification for Ozone Resistant Ethylene-Propylene Rubber Insulation

ACTIVITIES OF SUBCOMMITTEES

Subcommittee D-11.08, Nomenclature and Definitions (M. F. Torrence, chairman) has added several new definitions to Definitions D 1566 bringing the total number at the present time to over 80. By the end of 1970 this number will exceed 100. The importance of proper definitions is seriously considered by the subcommittee. It recognizes that these definitions can either generate or eliminate many legal and economic problems in the industry.

Recommended Practice D 1418, Nomenclature for Elastomers and Latices, is being changed to eliminate reference to materials other than rubber and to bring it in agreement with a similar ISO document.

Subcommittee D-11.10, Physical Testing (W. H. King, chairman) has re-edited the following two standards incorporating the SI system for the corresponding U.S. customary units: D 575, Method of Test for Compression-Deflection Characteristics of Vulcanized Rubber, and D 814, Method of Test for Permeability of Vulcanized Rubber or Synthetic Elastomers to Volatile Liquids.

Method D 412, Tension Testing of Vulcanized Rubber—There is considerable interest in adopting the practice of testing ring specimens rather than the more conventional dumbbell test specimens. A preliminary report presented at the Cincinnati meeting indicated its precision was well within that of the dumbbell specimen tensile test. It was pointed out in the report that problems were encountered with the ring cutter. The problems are involved in establishing and maintaining dimensions and cutting "good" rings over a wide range of hardnesses. Die prob-

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lems are recognized and efforts toward improvement are under consideration.

Method D 624, Tear Resistance of Vulcanized Rubber—For a number of years, there has been concern about the use of Die "C" for tear testing according to this standard. A rather complete and well-documented study of interlaboratory testing was made in 1967. This report indicated good correlation of values if the study involved only one tear test die. However, there was a great difference in results between specimens cut with various dies. As a result of this report, it was proposed that a definite radius be adopted for the 90-deg angle of the die rather than the present "sharp" angle. Experimentation indicated little change in actual test values if the radius of this die was between 0.005 and 0.010 in. Reproducibility appears better than with a real sharp angle die.

There are die manufacturers who indicate they can make dies with a nominal radius of 0.006 in. at the 90-deg intersection, but the sharpening will require a precision operation. It was pointed out at the Cincinnati meeting that a check on the die condition could possibly be by comparison of a specimen cut from cellophane and a standard die radius using a slide projector. On the other hand, it might be possible to use merely an optical comparator for this study. The effectiveness of such methods, hopefully, can be determined after experimentation in various laboratories.

Hopefully, a round-robin test can be conducted using three dies with a 0.006 ± 0.002 -in. radius at the 90-deg angle to determine the reproducibility of these dies and, at the same time, determine whether any problems will arise in sharpening such dies; recognizing this will be an operation requiring skill and precision.

Method D 639, Testing Battery Containers Made from Hard Rubber or Equivalent Materials—While this standard is presently being re-edited in accordance with the style conversion program for the 1970 *Annual Book of ASTM Standards*, work has been started to modify this standard to reflect present-day technology and new materials. This will be a lengthy project but, hopefully, a proposed document could be presented in 1970 for subcommittee consideration.

Method D 991, Volume Resistivity of Electrically Conductive and Anti-Static Rub-

bers—An editorial revision has been made in Fig. 1 of this standard. The revision is intended to clarify the test apparatus to be used in conducting electrical tests.

Proposed Standard, Permeability of Vulcanized Rubbers to Gases (Constant Pressure Method)—A task group is in the process of developing a proposed method of test. Consideration is being given to various current practices as well as to the proposed ISO document.

Precision and Sensitivity—While considerable time and effort has been expended in developing data for the basis of precision statements to be included in each test method under the jurisdiction of the subcommittee, the actual inclusion of statements is being held in abeyance pending guidance in this regard.

Unfortunately, the statements that resulted were extremely wordy and actually detracted from their utility and value. The task group will continue to accumulate test data but action relative to the inclusion of statements will be tabled pending the resolution of a standard procedure in this regard.

Subcommittee D-11.11, Chemical Analysis (Mrs. W. H. Mees, chairman) has resolved the objections which were raised when Methods D 1766, Solubility of Organic Chemicals, and D 1817, Specific Gravity of Rubber Chemicals, were proposed for recommendations as ANSI Standards.

Method D 1416, Chemical Analysis of Synthetic Elastomers (Solid Styrene-Butadiene Copolymers) has been revised and rewritten with a change in method title from ETA Extract to Total Extractables. It now allows the use of ETA (ethanol toluene azeotrope) and H-ITA (hydrous isopropanol-toluene mixture) as solvents. The additional solvent is especially recommended for alum coagulated polymers. A method for the analysis of substituted *p*-phenylenediamine antioxidant was also included.

Task group work in progress has to do with gathering of data for reproducibility and repeatability of the H-ITA section in Method D 1416 and the review of methods for analyzing styrene of SBR polymers over a wide styrene range with and without high styrene resins.

Two ISO methods, thin layer chromatographic analysis of antioxidants and polymer

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identification by combined pyrolysis/infrared, have been reported and discussed. Currently no task group work has been initiated.

Subcommittee D-11.12, Processibility Tests (G. E. Decker, chairman) has approved the incorporation of Methods D 2705 and D 2706 into a single method for the oscillating disk type curemeters. Standard operating conditions and standard geometry for the rotor and dies has been selected and approved. A task group is currently preparing a tentative method for letter ballot in both Subcommittee D-11.12 and Committee D-11.

Method D 1646, Viscosity and Curing Characteristics of Rubber by the Shearing Disk Viscometer, is under study for suggested revisions.

Work on Method D 2230, Test for Extrudability of Unvulcanized Elastomeric Compounds, to permit the use of a round die for evaluating the tubability of unvulcanized rubber compounds is continuing.

Subcommittee D-11.13, Adhesion Tests (P. J. Larsen, chairman) continued to survey and review various non-destructive testing (NDT) methods for rubber-metal bonded components. Speakers were invited to meetings, and reports were received from other sources to enlighten the subcommittee on NDT methods. Several members are currently evaluating the utility of various systems. It is anticipated that the investigation and eventual development of a standard will require considerable time and effort during the next few years.

Efforts to find a satisfactory dynamic test for rubber-metal bonded components continued during the year. The subcommittee is attempting to determine whether a Rotary Fatigue Test developed by B. F. Goodrich Research Center is applicable.

Also in 1969, the subcommittee continued to report to ISO/TC 45 that in its opinion the Quadruple Lap Shear Test is of little value because it is more a test of the rubber than the bond line. ISO will probably approve it as a standard method of test. However, it is willing to take under consideration the conical method described in Method D 429, Adhesion of Vulcanized Rubber to Metal. The subcommittee contends the conical method is not necessarily the ultimate, but does represent the best static method which is available.

Subcommittee D-11.14, Low-Temperature and Resilience Tests (F. S. Conant, chairman) has in progress the development of two new standards, a creep test and a low temperature flexibility test on coated fabric. A research program is being pursued on the anomalous behavior of certain silicone rubbers at low temperatures. Modernization of Method D 945, the Yerzeley Oscillograph, is under way. Definitions of terms relating to dynamic properties of rubber as described in Recommended Practice D 2231, Forced Vibration Testing of Vulcanizates, have been approved. The terms are generally in agreement with those in the corresponding ISO method. Interlaboratory tests for establishing precision and accuracy sections are in progress.

Subcommittee D-11.15, Life Tests (A. G. Veith, chairman) has recently completed a general updating of two methods dealing with stain and discoloration testing. These are Methods D 925, Contact and Migration Stain of Vulcanized Rubber in Contact with Organic Finishes, and D 1148, Discoloration of Vulcanized Rubber: Organic Finish Coated or Light Colored.

A task group on dynamic ozone testing methods has been active. It has developed an inexpensive portable flexing machine for use with small rubber covered fabric belts. This may be placed in laboratory ozone chambers. A round-robin test program is currently under way and specific recommendations for a test method are expected during 1970.

A task group under the joint jurisdiction of this subcommittee and Subcommittee D-11.25, Rubber Cements and Related Products, has been studying dynamic adhesion tests. The current effort is on methods for wire and glass cord adhesion to rubber. The development of a method or methods is proceeding slowly due to technical difficulties.

Liaison between ISO/TC 45, Working Group F (on Weathering and Degradation) has been maintained by G. C. Maassen. Currently, Group F is studying static ozone tests, aging and heat resistance, flex-crack and crack growth tests. Methods for cellular rubber degradation and flammability are also under study. The U.S. submitted a method for contact and migration stain measurement. Continued liaison will be maintained.

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An editorial revision of all the methods under the subcommittee's jurisdiction has been recently completed. Removal of out-of-date technical terms, test clarification, and conversion to SI units in both text and drawings were the principal changes made.

Subcommittee D-11.16, Statistical Quality Control (L. A. Bedford, chairman) is currently involved in developing a recommended practice setting forth the meaning of "precision" as it applies to Committee D-11 test methods. Toward this end it proposes to prepare a standardized precision statement for use by all subcommittees of D-11.

Subcommittee D-11.20, Compounding Materials and Procedures (W. J. Holley, chairman) has completed a study involving the molding of tensile specimens by either compression or injection. As a consequence, the subcommittee will propose to include injection molding in Method D 15, Compound and Sample Preparation for Physical Testing of Rubber Products.

In a new proposal for D 1765, Standard Classification System for Carbon Blacks in Rubber Products, the entire system has been revised to include the change from IRB No. 2 to IRB No. 3, the addition of several new blacks, and the inclusion of DBP and pour density values.

Work is in progress establishing a standardized mixing procedure for internal mixes. The procedure is intended for inclusion in Method D 15.

The National Bureau of Standards has recently made available the following standard reference materials (SRM):

Ingredient	SRM No.
Sulfur	371f
Gas furnace block (SRF type)	382a
Styrene-butadiene rubber, Type 1500	386g
Acrylonitrile-butadiene rubber (approximately 33 percent acrylonitrile)	391

Subcommittee D-11.21, Rubber Latexes (D. W. Cate, chairman) is continuing its program to update Specification D 1076, Concentrated, Ammonia Preserved, Creamed and Centrifuged Natural Rubber Latex, and Method D 1417, Testing Synthetic Rubber Latexes (Styrene-Butadiene Copolymers), to conform to industry practice and to ISO procedures. Evaluation of new procedures have also been undertaken which includes:

(1) determination of bound styrene of non-reinforced latexes in the 50 to 65 percent bound styrene range, (2) determination of polystyrene in polystyrene reinforced latexes, (3) determination of total polymeric styrene in polystyrene reinforced latexes, and (4) determination of residual acrylonitrile in NBR latexes. Standardization of testing in these areas, as soon as possible, is considered necessary before producers and consumers arrive at separate and different methods.

Subcommittee D-11.22, Natural Rubber (N. P. Bekema, chairman) has evaluated a synthetic polyisoprene test recipe containing 35 parts HAF black as a method of testing natural rubber. As a result of the efforts of a task group under the chairmanship of A. M. Finley, the subcommittee voted affirmatively to accept the recipe as an adjunct to the pure-gum recipe now in Method D 15. The recommendation of the task group as submitted in L. G. Mason's ISO/TC 45/WG C (USA) NR No. 47, was also accepted by ISO/TC 45, Working Group C and will go forward in a proposed draft recommendation to be written by Mr. Heal of the United Kingdom.

The Plasticity Retention Index as proposed by the Rubber Research Institute of Malaya requires some refinements to produce acceptable results. Accurate temperature controls within a narrow range are critical requirements for this test. Several recommendations have been proposed: (1) a special tubular oven developed in the U.K. capable of accurate temperature control (2) a rotating oven shelf to minimize temperature variations in a standard laboratory oven, as developed by B. F. Goodrich Co. (3) an SCR temperature controller capable of maintaining temperatures at 140 ± 0.25 C in a standard oven. This is available from T and T Controls, Media, Pa.

Other refinements such as Wallace Plastimeter modifications and techniques of operations will be reviewed in preparation for a move towards standardization.

A test method for the determination of color for light SMR rubbers has been drafted by the Rubber Research Institute of Malaya and is available from the Natural Rubber Bureau offices. The method essentially involves Wallace Plastimeter test pieces pressed between sheets of polyester (or cellophane)

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and evaluated against a Lovibond Comparator.

Subcommittee D-11.23, Synthetic Rubbers (R. V. Jones, chairman) is continuing its activity to attempt to standardize the formula method of test of SBR so that the ASTM method is consistent with ISO and also compatible with the basic method of compounding on parts per 100 of rubber hydrocarbon. Activities have been extended to the preparation of an SBR oil-carbon black masterbatch formula and method of test so that the USA would have an ASTM standard to submit to ISO in October.

Work is continuing on the testing of chloroprene rubber (CR) to establish an ISO method consistent with the ASTM method and similar action is being taken on acrylonitrile/butadiene rubber (NBR). Efforts in both of these areas are being coordinated with Subcommittee D-11.20, Compounding Materials and Procedures.

The subcommittee is also cooperating in providing a change in Method D 15, which is under the jurisdiction of Subcommittee D-11.20, to separate it into distinct parts, each covering a major polymer type, with one general method covering the basic equipment and procedures. This should provide for easier maintenance of the methods.

Subcommittee D-11.24, Solid Urethane (A. H. Johnson, chairman) continued its programs to develop and standardize methods of test related to the characterization of solid urethane elastomers. In tensile testing, modifications to improve Method D 412 were suggested to Subcommittee D-11.10, Physical Testing. These primarily were for the tensile testing of ring specimens in which the subcommittee has done experimentation and equipment development. Round-robins had been conducted to expand the scope of the project to include other rubbers as well as urethane.

Techniques for representative sample preparation of castable urethanes were explored, and significant progress was made. Most recently a program was initiated to acquire the technology to write test procedures to define the hydrolytic stability of urethanes.

Subcommittee D-11.25, Rubber Cements and Related Products (R. H. Moulton, chairman) has now completed the revision of all of the methods under its jurisdiction to in-

clude metric equivalents, and the renumbering of paragraphs according to the modified decimal system.

Considerable effort has been expended in attempts to obtain satisfactory methods for determination of dynamic adhesion, that is, the loss of bond strength which may occur in the flexing of rubbers reinforced by glass fiber cords or of multifilament wire cords. Interlaboratory test comparisons, based on Method D 2630, Strap Peel Adhesion of Textile Fabrics or Cords to Rubber, which had been successfully used in the case of textile cord reinforcement, showed either severe fatigue of the glass fibers under prescribed conditions, or of negligible bond fatigue under reduced conditions. Individual members of the subcommittee continued these efforts to find an appropriate method by carrying out suitable development programs.

Proposed methods suitable for the measurement of "green adhesion," or tack, have been proposed based on the use of the Tel-Tak and Ketjen instruments. Interlaboratory comparisons are presently in progress to determine the reliability of both of these methods.

The suitability of the present title of this subcommittee has been raised. It has been agreed that the title does not properly indicate the true nature of its responsibility, and that people who should have an interest in this work are not aware of it. Suitable alternative titles have been selected, and these will be submitted to the subcommittee for ballot.

Subcommittee D-11.31, Mechanical Rubber Hose (C. E. Taylor, chairman) has recommended that its identity be changed from *Mechanical Rubber Hose* to *Hose*. During the year the subcommittee has worked extensively in updating Method D 380, Testing Rubber Hose. Two primary changes agreed to were: (1) use of the original cross-sectional area of the test specimen as a basis for calculating physical effect of fluid immersion rather than using the cross-sectional area of the swollen specimen, and (2) elimination of duplicate fluid immersion description found in Methods D 380 and D 471 by deleting those sections in D 380 and cross-referencing the corresponding sections in D 471.

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Currently the subcommittee has under investigation the effect of test specimen thickness on physical property changes resulting from immersion in oils at elevated temperatures. Two round-robin programs were initiated and pursued by six laboratories. The first program involved two test compounds. The results of this study suggested a second and verifying round-robin involving three test compounds. The latter program is in its final stage of completion.

Subcommittee D-11.32, Belting (E. F. Webster, chairman) is involved with the preparation of test procedures for measuring flame retardancy and adhesion retention after heat aging. The subcommittee has plans to study existing ISO Recommendations for possible additions to Method D 378, Testing Flat Rubber Belting.

Subcommittee D-11.33, Flexible Cellular Materials (T. H. Rogers, chairman) has as one of its goals the bringing together of the various elastomeric cellular products under one set of test methods. A new test method for measuring the flow of air through urethane slab foam has been approved and is now part of Method D 1564. Its usefulness extends beyond urethane. For most cushioning applications the porosity of a cushion is important because it relates to the breathability, which in turn relates to seating comfort. The method has been passed on to ISO/TC 45 where considerable interest has aroused.

Flammability is a subject of immense concern in the flexible cellular materials field. Because of the large surface area exposed, the possibility of ignition and subsequent burning is greatly increased. A task group has been organized to examine the many flammability tests already existing and determine if one or more can successfully be applied to cellular materials. Over 26 tests have been screened including five ASTM methods. Thus far, a modification of Method D 1692 looks promising. This test consists of placing a foam specimen on a wire mesh screen, igniting the specimen for 60 s with a specified wing-tip bunsen burner having a blue flame, then removing the burner, and determining the time for the flame to extinguish, or measure the amount of foam that was consumed during the burn.

Test methods applicable to polyolefin-base

foams are also being studied by the subcommittee.

Subcommittee D-11.34, Protective Equipment for Electrical Workers (C. R. Chapin, chairman) has the responsibility for preparing and maintaining standards for electrical protective equipment. These standards cover materials and equipment used by electrical workers to prevent injury from hazards associated with their trade or profession. In line with these responsibilities revisions of the following specifications were completed during the past year: D 120, Rubber Insulating Gloves, D 1048, Rubber Insulating Blankets, and D 1051, Rubber Insulating Sleeves. In addition, recommendation was made for the reaffirmation of Specifications D 178, Rubber Matting for Use Around Electric Apparatus, D 1049, Rubber Insulator Hoods, and D 1050, Rubber Insulating Line Hose.

At the present time a new task group is being organized to revise Specifications D 1049 and D 1050. In updating these specifications consideration will be given to insulating materials, other than rubber, that are in normal use for electrical protection for which no standards exist.

Subcommittee D-11.35, Insulated Wire and Cable (E. G. Driscoll, chairman) has completed its initial work on specifications for ethylene-propylene rubber. Further work in this area is needed to meet the rigorous requirements expected from the utilities on high-voltage insulation. A letter ballot is in progress on Specifications for Extruded Thermosetting and Thermoplastic Semi-Conducting Conductor and Insulation Shields. There is still much work to be done in bringing up to date the subcommittee's methods and specifications. At the instigation of the American National Standards Institute a task group has been formed to revise its C8.35 Specification on Weather-Resistant Wire and Cable, Polyethylene Types.

Subcommittee D-11.36, Seals (R. F. Anderson, chairman) has reactivated its O-ring Task Group to update and improve Method D 1414, Testing Rubber O-Rings, to include a corrosion test, a method for determining compression set in fluids, an improved means for measuring O-ring dimensions, and an improved procedure for determining O-ring hardness.

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The Elastomer/Lubricant Task Group has prepared for action on the part of Committee D-11 a tentative method for determining the compatibility of vulcanized elastomeric seals in service media. This activity resulted from a request by RMA for a method to screen new fluids which are being used in contact with seal installations. A number of instances of seal deterioration have been reported because of the failure to evaluate elastomer compatibility with the fluid.

Subcommittee D-11.37, Coated Fabrics and Rubber Thread (W. H. Bryan, chairman) is currently involved in developing the following test methods for coated fabrics and rubber thread:

(1) A task group has been assigned the responsibility of preparing a method for evaluating the pliability of coated fabric at low temperatures in conjunction with and under the direction of Subcommittee D-11.14, Low Temperature and Resilience Tests. Problems have been encountered when attempting to obtain equipment capable of operating at low temperature. Two sources are now being explored, and it is hoped that progress will be made in the very near future.

(2) An effort is under way to develop a new method for measuring the abrasion resistance of coated fabric. A task group is evaluating three procedures under the direction of R. E. Ofner, Rock Island Arsenal. A report was presented at the June meeting.

(3) A task group is presently investigating the possibility of developing a test method for measuring the flame resistance of coated fabrics. Efforts are being made to work closely with Committee E-5 and Section D-11.54Y, Flammability. The chairman is also reviewing a proposed ISO Document and will continue to have discussions with personnel of Committee E-5.

(4) A task group was appointed at the December meeting and assigned the responsibility for developing a test method for evaluating the ozone resistance of coated fabrics. This work is now in the exploratory stage. A progress report was presented at the June meeting.

(5) The task group charged with the responsibility for revising and updating Method D 2433, Testing Rubber Thread, has

completed its initial assignment. A proposed revised method is now being letter balloted simultaneously in the subcommittee and Committee D-11.

The subcommittee is also working with the Coated Fabrics Section of RMA with the expectations that there will be complete cooperation between the two groups relative to developing test methods which will be generally acceptable to all. Furthermore, both groups will review copies of ISO Documents which are pertinent to our specific industry and will continue to cooperate with the participating countries in developing acceptable ISO Draft Recommendations for evaluating coated fabrics.

Subcommittee D-11.39, Insulating Tape (W. C. Smith, chairman) has found the values obtained from the fusion test procedure described in Methods D 119 and D 1373 are inconsistent and dependent upon whether $\frac{3}{4}$ or 2-in. specimens are employed. The advisability of standardizing on a $\frac{3}{4}$ -in. specimen width was firmly proven by a round-robin program recently completed. A Committee D-11 letter ballot is currently in progress setting forth this specimen width.

The subcommittee has now assumed the task of developing specifications for semi-conducting tapes.

Subcommittee D-11.45, USA Committee for International Standards on Rubber (R. D. Stiehler, chairman) was very active during the year. The following members were delegates to the Seventeenth Plenary Meeting of ISO Technical Committee 45 on Rubber held in The Hague, Netherlands, from Oct. 3 to 11, 1969: R. D. Stiehler (leader of USA delegation), G. C. Maassen (Chairman of Committee D-11), W. H. King (Vice-Chairman of Committee D-11), J. F. Kerscher (Secretary of Committee D-11), N. P. Bekema, W. H. Bryan, D. W. Cate, F. S. Conant, A. E. Daniell, G. D. Gingold, R. W. Jones, P. J. Larsen, L. G. Mason, J. P. Mathews, Mrs. W. H. Mees, W. H. Mees, T. H. Rogers, F. E. Timmons, M. F. Torrence, and A. E. Williams.

At the meeting, there were 196 delegates and observers from 20 countries. Results of the meeting were reflected in 34 draft recommendations approved for submission to ISO Council, and 29 draft recommendations and 18 draft proposals approved for letter

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ballot. G. C. Maassen served as convener of Working Group F on Degradation Tests, M. F. Torrence served as convener of Working Group L on Terminology, R. W. Jones served as convener of the Task Group on Synthetic Rubber in Working Group C, and Mrs. W. H. Mees substituted for W. P. Tyler as convener of the Task Group on Antioxidant Identification in Working Group A.

ISO/TC 45 has undertaken work on methods for flammability of rubber and nomenclature for rubber compounding materials.

Recommendations were made to the American National Standards Institute for voting on 26 Draft ISO Recommendations and 16 draft proposals.

SAE-ASTM Technical Committee on Automotive Rubber (Maurice Lowman, chairman), which is a joint committee of the Society of Automotive Engineering and the American Society for Testing and Materials, is maintaining programs through a number of its products sections.

Section D-11.53, *Automotive Hose*, worked on windshield washer and wiper hose specifications. A revision is under way for coolant hose testing, compression set, and flexing procedures. The section anticipates that this will be completed by July 1, 1971. The recommended practices for specifying, drawing, and dimensioning of curved coolant hose is under active consideration and has a target date of Dec. 31, 1971. There was a specification drawn and accepted on Type G hose during 1969 and there is work active to standardize hoses.

The direction of the Vacuum Hose Task Group is to attempt to write SAE-J1403 on the basis of performance. It is hoped that this will be completed by July 1971.

Section D-11.54, *Classification and Specifying of Automotive Rubber*, continued to update Classification D 2000 during 1969. This is a continuous job.

Section D-11.56, *Automotive Belt and Pulley*, worked actively with pulley manufacturers during the past year. The work of L. M. Confer in the last 12 years as chairman of the committee has been appreciated. Mr. Confer is retiring. The committee will probably, during 1970, become a full section of the SAE General Materials Council, and will most likely cease to be a section of TCAR. The ASTM is balloting the test procedure for Automotive V-belts. This will be a duplicate of SAE J-637. The Automotive Suspension Subcommittee, Section D-11.65, has completed one round robin on MTS testers for dynamic rate and damping constant. The results were not readily analyzable by statistical methods. A change in the design of the experiment has been made and further tests will be completed in 1970. A large amount of activity on the fatigue testing procedures on bushings has taken place but no final report has been written.

Section D-11.66, *Oil Seals*, has been very active in the field of inspection standards for crooked and rough trim. It has worked with other organizations on a seal handbook, which was distributed during the year. Further work is planned on rubber lubricant compatibility, seal applications, garter springs, cold tests, and hydraulic seals.

The year has been one of consolidating and revising present specifications rather than one of writing new tests and methods. One test method anticipated will be the flammability tests for chassis automotive parts. This is a very reproducible test and should form an important part of the test technology.

Respectfully submitted on behalf of the committee,

G. C. MAASSEN,
Chairman

J. F. KERSCHER,
Secretary

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D-12 ON SOAPS AND OTHER DETERGENTS

Committee D-12 on Soaps and Other Detergents held one meeting during the year: in New York, N. Y., Nov. 17 and 18, 1969. As of May 1970 the committee has 110 members, of whom 54 are classified as producers, 26 as consumers, and 30 as general interest members.

Two programs of three talks each were presented at the meeting, one on each day. The theme of both programs was "How the User Judges Detergents." The first day was devoted to industrial users and consisted of the following talks: "Cleaning Materials and Processes in the Baking Industry" by Robert S. Taggart, National Biscuit Co., "Evaluation of Surfactants for the Textile Mill" by Dr. Donald R. Moore, J. P. Stevens and Co., "Qualification Testing of Exterior Aircraft Cleaning Materials" by Charles E. Owens, United Air Lines. The second day's talks on consumer products were: "What Consumers Ask About Soaps and Detergents" by Margaret Dana, Consumer Relations Counsellor, "Household Detergent Evaluation by Bundle Testing" by Cora Green, Colgate-Palmolive Co., "How Can I Find Out What I Need to Know Before Buying a Detergent" by Morris Kaplan, Consumers Union Inc.

A new subcommittee, S-5 on Consumer Standards for Packaged Household Laundry Detergents, was created in response to a request from the ASTM Board of Directors, acting on a proposal from the Committee on Consumer Standards. Mrs. Joan Mees was appointed chairman of S-5, which held its first organizational and planning session during the meeting. Subsequently S-5 has held meetings March 6 and May 4, 1970, both in New York. S-5 has submitted a report to the Executive Committee in the form of an article intended for publication in *Materials Research and Standards*.

Elections were held. The officers who have

served D-12 during the past term were re-nominated and reelected. The membership of the Executive Committee also remains unchanged.

The D-12 Award for outstanding technical achievement in the field of soaps and detergents was presented to Eugene W. Blank. The presentation was made by William H. Joy, chairman of the Awards Committee. Mr. Blank was cited for his contributions in the field of analyzing and testing detergents, many of which have been made through his ASTM activities.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee D-12 presented to the Society through the Interim Procedure for Standards, the following recommendations which were accepted on the dates indicated. These Standards will be published in Part 22 of the *1970 Annual Book of ASTM Standards*.

Adoption of Tentatives as Standard Without Revision: (effective May 29, 1970)

- D 2667 - 70** (formerly D 2667 - 67 T), Test for Biodegradability of Alkylbenzene Sulfonates (Subcommittee D12.17)
- D 2760 - 70** (formerly D 2760 - 68 T), Analysis of Sodium Triphosphate by the Simplified Paper Chromatographic Method (Subcommittee D12.13)
- D 2761 - 70** (formerly D 2761 - 68 T), Analysis of Sodium Triphosphate by the Simplified Ion Exchange Method (Subcommittee D12.13)
- D 2762 - 70** (formerly D 2752 - 69 T), Specification for Drycleaning Detergent, Liquid Charge Type (Subcommittee D12.13)
- D 2763 - 70** (formerly D 2763 - 69 T),

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Specification for Drycleaning Detergent, Non-Charge Type (Subcommittee D12.13)

Reapproval of Standards:

- D 456 - 39 (1970)**, Specification for Caustic Soda (Anhydrous)
- D 457 - 39 (1970)**, Specification for Modified Soda (Sesquicarbonate Type)
- D 458 - 57 (1970)**, Specification for Soda Ash
- D 500 - 55 (1970)**, Chemical Analysis of Sulfonated and Sulfated Oils
- D 537 - 57 (1970)**, Specification for Sodium Metasilicate
- D 538 - 60 (1970)**, Specification for Trisodium Phosphate
- D 594 - 41 (1970)**, Specification for Sodium Sesquicarbonate
- D 595 - 45 (1970)**, Specification for Tetrasodium Pyrophosphate (Anhydrous)
- D 820 - 58 (1970)**, Chemical Analysis of Soaps Containing Synthetic Detergents
- D 928 - 52 (1970)**, Specification for Sodium Bicarbonate
- D 929 - 50 (1970)**, Specification for Borax
- D 1172 - 56 (1970)**, Test for pH of Aqueous Solutions of Soaps and Detergents
- D 1173 - 53 (1970)**, Test for Foaming Properties of Surface-Active Agents
- D 1331 - 56 (1970)**, Tests for Surface and Interfacial Tension of Solutions of Surface-Active Agents
- D 2021 - 65 (1970)**, Specification for Neutral Detergents, 40 Percent Alkylbenzene Sulfonate Type
- D 2022 - 64 (1970)**, Sampling and Chemical Analysis for Chlorine-Containing Bleaches
- D 2024 - 65 (1970)**, Test for Cloud Point of Nonionic Surfactants
- D 2179 - 65 (1970)**, Specification for Combination Bar Soap
- D 2180 - 64 (1970)**, Test for Active Oxygen in Bleaching Compounds

AMERICAN NATIONAL STANDARDS

Six Standards under the jurisdiction of Committee D-12 were approved January 1970 as American National Standards by the American National Standards Institute (ANSI).

- D 455 - 69; ANSI K60.6-1970**, Specifications for Milled Toilet Soap
- D 497 - 62; ANSI K60.2-1970**, Specifications for Ordinary Laundry Bar Soap

D 499 - 69; ANSI K60.4-1970, Specifications for White Floating Toilet Soap

D 533 - 69; ANSI K60.7-1970, Specifications for Built Soap, Powdered

D 595 - 69; ANSI K60.13-1970, Specifications for Salt-Water Soap (Coconut Oil Type)

D 799 - 69; ANSI K60.14-1970, Specifications for Liquid Toilet Soap

ACTIVITIES OF SUBCOMMITTEES

Subcommittee T-2 on Analysis of Soaps and Synthetic Detergents (E. A. Setzkorn, chairman)—Task Group 4 on Separation of Active Ingredient is reviewing Method D 2358. A new procedure has been written to include the isolation of a nonionic fraction. This is scheduled for use-testing and should be ready for action at the next meeting. Task Group 16 on Qualitative Identification of Surfactants is working to provide rapid color tests which will enable classification without the use of sophisticated instrumentation. The work is limited to five classes of surfactant: soap, linear alkyl sulfonate, alcohol sulfate, sulfated ethoxylate, free nonionic, and cationic. A method has been written and will be circulated to the task group membership. Task Group 26 on Analysis of Nonionics has written a method for analysis of ethylene oxide content of nonionics. After some agreed-upon modifications it will be circulated for approval. Task Group 27 on Fatty Alcohol Analysis is currently inactive, pending communication with Committee E-15 on their work in the same area. Task Group 28 on Analysis of Fatty Amides is discontinuing its work because of sharply diminished interest on the part of the membership. Task Group 29 on Analysis of Anionics by Mixed Indicator Titration is continuing its round-robin testing of a colorimetric procedure which appears to be working well. Task Group 31 on Analysis of Detergent Enzymes is actively continuing its work, and intends to have a "for information only" procedure available for the next committee meeting.

Subcommittees T-3 and S-3 on Drycleaning Detergents (A. R. Martin, chairman)—Interlaboratory testing has been completed on a procedure for measuring insoluble soil removal and redeposition. The results are being correlated. Task groups were appointed to start work on three new items: determina-

REPORT OF COMMITTEE D-12

tion of water in a detergent-solvent solution, determination of partial pressure of water vapor over such solutions, and determination of anionic detergent in solution.

Subcommittees T-4 and S-4 on Inorganic Alkaline Detergents (R. M. Kelley, chairman)—Methods of test and specifications are being worked on for potassium pyrophosphate, anhydrous and potassium pyrophosphate, 60 percent solution.

Subcommittee T-5 on Physical Testing (O. Neiditch, chairman)—Only one task group has been active during the past year, Task Group 5 on Fluorescent Whitening Agents. Task Group 1 on Detergency Redeposition and Reflectance Measurement will be reactivated during the year. The subcommittee as a whole will act to consider possible minor revisions in D 1173 that have been suggested in correspondence to the D-12 chairman.

Subcommittee T-6 on Hard Surface Cleaning (T. Treitler, chairman)—Task Groups 16 on Automatic Dishwashing and 26 on Organic Surfaces have been active during the past year, and intend to have methods of test

for recommendation at next year's meeting. Task Group 36 on Metal Cleaning has been inactive.

Subcommittee T-7 on Biodegradability of Synthetic Detergents (J. Shewmaker, chairman) is considering methods for nonionic surfactants, and the applicability of D 2667-70 to other anionic surfactants.

Subcommittee S-2 on Specifications for Soaps and Synthetic Detergents (J. Cramer, chairman)—Task Group 3 on Soap Specifications is working on a specification for cake toilet soap containing a germicide. Task Group 5 on Hand Cleaner Specifications is continuing its work. Two specifications, one on soap with vegetable scrubber and one on soap with borax, were recommended to be published for information only.

Respectfully submitted on behalf of the committee,

A. M. SCHWARTZ,
Chairman

J. B. SCHAPIRO,
Secretary

REPORT OF COMMITTEE D-13 ON TEXTILE MATERIALS

Committee D-13 on Textile Materials held two, four-day meetings in October 1969 and in March 1970 in New York, N. Y. At each meeting some 75 to 80 subcommittees, task groups, and special committees met to discuss revisions of existing D-13 standards and the development of new methods.

Committee D-13 has a voting membership of 396, with 172 of these being classified as producers, 66 as consumers, and 158 as general interest.

Due to the increased activity in the committee and the resulting administrative responsibilities, the bylaws of the committee were revised to provide for the election of a fourth vice-chairman. A realignment of the responsibilities of the vice-chairmen resulted in the following assignments: The first vice-chairman will assist the chairman in special assignments and will also serve as chairman of the Awards and Honors Committee. One vice-chairman will be responsible for the activities of all "A" subcommittees, one for all "B" subcommittees, and one for all "C" subcommittees.

The scope of Committee D-13 has been expanded to clarify the distinction between the fields of work of Committee D-13 on textile fibers and that of Committee D-30 on High Modulus Fibers and Their Composites. The scopes of all subcommittees have been reviewed and revised where desirable to define more clearly specific areas of responsibility in fields where subcommittee interest overlap. The responsibilities of some subcommittees have been split among formerly recognized sections within the subcommittee. In this connection a separate section on "flammability testing" has been set up in Subcommittee B-1. Subcommittee A-12 on Nonwoven Fabrics has been discontinued and the responsibilities for this work have been assigned to Section 4 of Subcommittee

B-9 on Fabrics. Other sections of B-9 include Section 1, General; Section 2, Woven Fabrics; and Section 3, Knitted Fabrics. A new task group has been organized in Subcommittee B-4 to cover care labeling of ultimate consumer products, and a separate task group is working on standards for testing stitched, quilted fabrics.

The committee cosponsored with the American Society for Quality Control, the American Association of Textile Chemists and Colorists, The Apparel Research Foundation, the Apparel Manufacturers Association, Retail Merchants Association, and the School of Textiles at North Carolina State University a Symposium on Wear Testing of Textile Fabrics. Papers presented at this symposium have been published and distributed to all who attended as well as to the members of the sponsoring associations. The symposium had an excellent program of papers and was attended by more than 200 scientists from this country and abroad.

At the March meeting of the committee a special program was presented on the subject of care labeling of textiles. Mrs. Virginia Knauer, Special Assistant to the President for Consumer Affairs, was the featured speaker. This program, which was cosponsored with the New York District, was the highlight of the March meeting and was well attended by ASTM members as well as interested representatives from various branches of the textile industry. Mrs. Knauer's presentation was followed by a panel discussion, chaired by Braham Norwick, Director of Research for Beaunit Textiles, Inc.

During this past year there has been a surge of interest in the textile industry in the development of test methods and performance standards for textile products. This has been spurred to a large extent by the interest

REPORT OF COMMITTEE D-13

in flammability of textile products and in the care labeling of textile products. This increased interest has resulted in a tremendous amount of activity within the committee and in the attracting of new members to the committee and the Society who are interested in working in these important activities. In order to assist the committee in responding to the needs and desires of the textile industry, a Long Range Planning Committee was formed under the chairmanship of Braham Norwick. The committee is composed of executives representing all segments of the textile industry, and they have been requested to assist the officers of Committee D-13 in identifying areas of activity in which the committee should be involved in the development of test methods and performance standards. In addition, this advisory group has been requested to make recommendations relative to methods by which Committee D-13 could be more responsive to the needs of the industry and also more responsive to the technological changes which are taking place in the industry that may result in needs for either new or modified test methods and performance standards. It is also hoped that the Long Range Planning Subcommittee will assist the officers of Committee D-13 in identifying methods by which D-13 can be more responsive to needs of the industry and reduce the response time from identifying a need to the publishing of appropriate test methods. There is at the present time a tremendous explosion of new technologies in the textile industry. It is the hope of the officers of Committee D-13 that this committee, as well as the Society, will find means to respond with minimum delays in meeting the needs of the industry.

At the October 1969 meeting, the Harold De Witt Smith Memorial Medal was presented to Dr. W. James Lyons, Director, Physics and Mechanical Processing, Textile Research Institute, Princeton, N. J.

Dr. Arthur G. Scroggie, long-time member of Committee D-13 and presently chairman of the Editorial C-6 Subcommittee, was awarded the ASTM Society Honorary Membership in 1970.

E. W. S. Calkins of Committee D-13 received the ASTM Award of Merit at the Society Annual Meeting in 1970 in Toronto,

Canada.

At the March 1970 meeting, the Executive Committee approved D-13 Honorary Membership Awards to J. Murphy Cook, H. A. Ehrman, Kenneth L. Hertel, G. K. Lake, and Louis Tanner. The appointment of H. A. Ehrman as D-13 Secretary Emeritus was also approved at this meeting.

The following appointments were made to Committee D-13 subcommittees and related activities:

E. W. Lothrop, Jr., Chairman, Subcommittee B-6 (replacing Miss Josephine Blandford)

G. M. Richardson, Chairman, Subcommittee B-1, Section 1

W. M. Segall, Secretary, Subcommittee B-1, Section 1

R. M. Luce, reappointed Secretary, Subcommittee A-9

D. R. Gentry, Secretary, Subcommittee B-9 (replacing L. R. Beaver)

J. Ziolkowski, Chairman, Subcommittee B-9, Section 1

J. P. Patton, Secretary, Subcommittee B-9, Section 1

J. N. Alexander, Chairman, Subcommittee B-9, Section 3

R. M. Cowdrey, Secretary, Subcommittee B-9, Section 4

Karl M. Fox, appointed to Subcommittee D11.37 on Coated Fabrics of Committee D-11

J. R. McAteer appointed to Committee E-1, Subcommittee 4

RECOMMENDATIONS ACCEPTED BY THE COMMITTEE ON STANDARDS

Subsequent to the 1969 annual report, Committee D-13 submitted the following recommendations to the Society through the Committee on Standards which became effective on the dates indicated:

New Tentatives:

D 2811 - 69 T, Conducting Cotton System Spinning Tests for Measurement of Spinning Performance (Subcommittee A-1) (effective Sept. 17, 1969)

D 2812 - 69 T, Test for Non-Lint Content of Cotton (Subcommittee A-1) (effective Sept. 17, 1969)

This new tentative revises and combines D 1451 and D 2254.

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- D 2814 - 69 T**, Test for Color Change Due to Flat Abrasion (Frosting) (Subcommittee B-9) (effective Sept. 17, 1969)
- D 2816 - 69 T**, Determination of Cashmere Coarse-Hair Content in Cashmere (Subcommittee A-3) (effective Sept. 17, 1969)
- D 2817 - 69 T**, Specification for Maximum Coarse-Hair Content in Cashmere (Subcommittee A-3) (effective Sept. 17, 1969)
- D 2859 - 70 T**, Test for Flammability of Finished Textile Floor Covering Materials (Subcommittee A-11) (effective May 8, 1970)
- D 2906 - 70 T**, Recommended Practice for Statements on Precision and Accuracy (Subcommittee B-4) (effective July 24, 1970)

New Proposed Method for Information Only:

Proposed Method of Test for Coefficient of Friction, Yarn to Metal (Subcommittee B-8)

Revision of Tentatives:

- D 2594 - 69a T** (formerly D 2594 - 69 T), Test for Stretch Properties of Knitted Fabrics Having Low-Power (Subcommittee B-9) (effective Sept. 17, 1969)
- D 2724 - 69 T** (formerly D 2724 - 68 T), Testing Bonded and Laminated Apparel Fabrics (Subcommittee B-4) (effective Sept. 17, 1969)

Standard Revised and Reverted to Tentative:

- D 1059 - 69 T** (formerly D 1059 - 57), Yarn Number Based on Short-Length Specimens (Subcommittee B-8) (effective Sept. 17, 1969)

Intention to Withdraw Standards Without Replacement:

- D 539 - 53**, Tests for Apparent Fluidity of Dispersions of Cellulose Fibers (to become effective October 1970)
- D 2056 - 63**, Test for Resistance of Finish of Zippers to Dry Abrasion (to become effective October 1970)
- D 2404 - 67**, Testing Jute Backing Fabrics (to become effective October 1970)

Withdrawal of Tentatives:

- D 626 - 55 T**, Specification for Fire-Retardant Properties of Treated Textile Fabrics

Withdrawn in accordance with three-year rule for tentatives.

- D 2254 - 64 T**, Test for Non-Lint Content of Cotton (SRRL Non-Lint Tester Method) (effective Sept. 17, 1969) Incorporated into Method D 2812.

- D 2264 - 64 T**, Recommended Practice for Calculating Number of Tests to Be Specified in Determining Average Quality of a Textile Material (effective July 24, 1970)

Withdrawn in accordance with three-year rule for tentatives.

Withdrawal of Standard:

- D 1451 - 67**, Test for Non-Lint Content of Cotton (Shirley Analyser Method) (effective Sept. 17, 1969)

Incorporated into Method D 2812.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee D-13 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which were accepted by the Society effective on the dates indicated:

Adoption of Tentatives as Standard Without Revision:

- D 376 - 70** (formerly D 376 - 66 T), Specification for Holland Cloth (Subcommittee B-9.5) (effective Oct. 2, 1970)
- D 377 - 69** (formerly D 377 - 67 T), Tests for Small Amounts of Copper and Manganese in Textiles (Subcommittee B-1) (effective Oct. 3, 1969)
- D 1116 - 69** (formerly D 1116 - 65 T), Test for Resistance of Pile Floor Coverings to Attack by Black Carpet Beetle Larvae (Subcommittee A-11) (effective Oct. 3, 1969)
- D 1442 - 70** (formerly D 1442 - 68 T), Test for Maturity of Cotton Fibers (Sodium Hydroxide Swelling and Polarized Light Methods) (Subcommittee A-1) (effective July 15, 1970)
- D 2402 - 69** (formerly D 2402 - 65 T), Test for Water Retention of Fibers (Centrifuge Method) (Subcommittee B-7) (effective Oct. 3, 1969)
- D 2462 - 69** (formerly D 2462 - 66 T), Test

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- for Moisture in Wool by Distillation with Toluene (Subcommittee A-3) (effective Oct. 3, 1969)
- D 2514 - 70** (formerly D 2514 - 66 T), Tolerances for Certain Woven Fabrics Made from All-Cotton or From Cotton/Man-Made Fiber Blends (Subcommittee B9.2) (effective Oct. 2, 1970)
- D 2525 - 69** (formerly D 2525 - 66 T), Devising a Sampling Plan for Various Forms of Wool for the Determination Moisture Content (Subcommittee A-3) (effective Oct. 3, 1969)
- D 2612 - 69** (formerly D 2612 - 67 T), Determination of Fiber Cohesion in Sliver and Top in Static Tests (Subcommittee B-7) (effective Oct. 3, 1969)
- D 2720 - 69** (formerly D 2720 - 68 T), Recommended Practice for Calculation of Commercial Weight and Yield of Scoured Wool, Top, and Noil for Various Commercial Compositions (Subcommittee A-3) (effective Oct. 3, 1969)
- D 2812 - 70** (formerly D 2812 - 69 T), Test for Non-Lint Content of Cotton (Subcommittee A-1) (effective Aug. 14, 1970)
- Adoption of Tentatives as Standard with Revision:*
- D 179 - 69** (formerly D 179 - 62 T), Testing Cotton Tire Cords and Cord Fabrics (Subcommittee A-9) (effective Oct. 3, 1969)
- D 204 - 69** (formerly D 204 - 57 T), Testing Sewing Threads (Subcommittee B-8) (effective Oct. 3, 1969)
- D 1244 - 69** (formerly D 1244 - 67 T), Recommended Practice for Designation of Yarn Construction (Subcommittee B-8) (effective Oct. 3, 1969)
- D 2256 - 69** (formerly D 2256 - 66 T), Test for Breaking Load (Strength) and Elongation of Yarns by the Single Strand Method (Subcommittee B-8) (effective Oct. 3, 1969)
- D 2258 - 69** (formerly D 2258 - 66 T), Sampling Yarn for Testing (Subcommittee B-8) (effective Oct. 3, 1969)
- D 2491 - 69** (formerly D 2491 - 66 T), Test for Staple Crimp in Grease Wool Locks (Subcommittee A-3) (effective Oct. 3, 1969)
- D 2495 - 70** (formerly D 2495 - 66 T), Test for Moisture in Cotton by Oven-Drying Method (Subcommittee A-1) (effective July 15, 1970)
- D 2524 - 69** (formerly D 2524 - 66 T), Test for Breaking Tenacity of Wool Fibers, Flat Bundle Method— $\frac{1}{8}$ -in. Gage Length (Subcommittee A-3) (effective Oct. 3, 1969)
- D 2646 - 69** (formerly D 2646 - 68 T), Testing Backing Fabrics (Subcommittee A-11) (effective Oct. 3, 1969)
- D 2724 - 70** (formerly D 2724 - 69 T), Testing Bonded and Laminated Apparel Fabrics (Subcommittee B-4) (effective Aug. 14, 1970)
- Revision of Standards:*
- D 123 - 70** (formerly D 123 - 69a), Definitions of Terms Relating to Textile Materials (Subcommittee B-2) (effective Aug. 14, 1970)
- D 123 - 69a** (formerly D 123 - 69) Definitions of Terms Relating to Textile Materials (Subcommittee B-2) (effective Oct. 3, 1969)
- D 472 - 69** (formerly D 472 - 68), Specifications for Fineness of Wool Top and Assignment of Grade (Subcommittee A-3) (effective Oct. 3, 1969)
- D 584 - 69** (formerly D 584 - 68), Test for Wool Content of Raw Wool—Laboratory Scale (Subcommittee A-3) (effective Oct. 3, 1969)
- D 628 - 70** (formerly D 628 - 52), Testing Asbestos Tubular Sleaving (Subcommittee A-4) (effective July 15, 1970)
- D 737 - 69** (formerly D 737 - 67), Test for Air Permeability of Textile Fabrics (Subcommittee B-9) (effective Oct. 3, 1969)
- D 1117 - 69** (formerly D 1117 - 63), Testing Nonwoven Fabrics (Subcommittee A-12) (effective Oct. 3, 1969)
- D 1334 - 69** (formerly D 1334 - 67), Test for Wool Content of Raw Wool—Commercial Scale (Subcommittee A-3) (effective Oct. 3, 1969)
- D 1381 - 69** (formerly D 1381 - 68), Specifications for Fineness of Mohair Top and Assignment of Grade (Subcommittee A-3) (effective Oct. 3, 1969)
- D 1771 - 70** (formerly D 1771 - 62 (1969)), Sample Reweighing of Lots of Packaged Raw Wool (Subcommittee A-3) (effective Aug. 14, 1970)
- D 2060 - 70** (formerly D 2060 - 63), Meas-

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- uring Zipper Dimensions (Subcommittee B-4) (effective Aug. 14, 1970)
- D 2061-70** (formerly D 2061-63), Strength Tests of Zippers (Subcommittee B-4) (effective Aug. 14, 1970)
- D 2130-69** (formerly D 2130-61), Test for Diameter of Wool and Other Animal Fibers by Microprojection (Subcommittee A-3) (effective Oct. 3, 1969)

Reapproval of Standards:

- D 181-42** (1970), Specifications and Methods of Test for Certain Heavy Cotton Fabrics for Manufacture of Hose and Belting (Subcommittee B-9.5)
- D 230-44** (1970), Specifications for Numbered Cotton Duck and Army Duck (Subcommittee B-9.2)
- D 231-62** (1970), Testing and Tolerances for Knit Goods (Subcommittee B-9.3)
- D 259-44** (1970), Testing and Tolerances for Woven Tapes (Subcommittee B-9.2)
- D 434-42** (1970), Test for Resistance to Yarn Slippage in Silk, Rayon, and Acetate Woven Fabrics (Subcommittee B-9.2)
- D 462-64** (1970), Testing and Tolerances for Certain Wool and Part Wool Fabrics (Subcommittee B-9.2)
- D 861-64** (1970), Recommended Practice for Use of the Tex System to Designate Linear Density of Fibers, Yarn Intermediates, Yarns, and Other Textile Materials (Subcommittee B-8)
- D 990-58** (1970), Recommended Practice for Interlaboratory Testing of Textile Materials (Subcommittee B-5)
- D 1234-54** (1969), Sampling and Testing Staple Length of Grease Wool (Subcommittee A-3)
- D 1283-57** (1969), Test for Alkali-Solubility of Wool (Subcommittee A-3)
- D 1284-59** (1970), Tests for Relaxation and Felting Shrinkage in Laundering of Stabilized Knit Wool Fabrics (Subcommittee B-9.3)
- D 1336-64** (1970), Test for Yarn Distortion in Woven Fabrics (Subcommittee B-9.2)
- D 1376-64** (1970), Testing Warp Knit Fabrics (Subcommittee B-9.3)
- D 1379-64** (1970), Operating Machine for Testing Abrasion Resistance of Textile Yarns (Subcommittee B-8)
- D 1388-64** (1970), Tests for Stiffness of Fabrics (Subcommittee B-9.1)
- D 1424-63** (1970), Test for Tear Resistance of Woven Fabrics by Fallen-Pendulum (Elmendorf) Apparatus (Subcommittee B-9.2)
- D 1576-64** (1970), Test for Moisture in Wool by Oven-Drying (Subcommittee A-3)
- D 1682-64** (1970), Tests for Breaking Load and Elongation of Textile Fabrics (Subcommittee B-9.1)
- D 1771-62** (1969), Sample Reweighing of Lots of Packaged Raw Wool (Subcommittee A-3)
- D 1777-64** (1970), Measuring Thickness of Textile Materials (Subcommittee B-9.1)
- D 1910-64** (1970), Test for Construction Characteristics of Woven Fabrics (Subcommittee B-9.2)
- D 2255-64** (1970), Grading Cotton Yarns for Appearance (Subcommittee B-8)
- D 2260-64** (1970), Conversion of Yarn Number Measured in Various Numbering Systems (Subcommittee B-8)

AMERICAN NATIONAL STANDARDS

The following new, revised, and reapproved ASTM Standards were recommended to ANSI Standards Committee L14 on Textiles, voted to be submitted to the American National Standards, and then were approved by the Institute as ANSI Standards.

Approval of ASTM Standards as New American National Standards:

- D 122-68**, Tolerances for Tire Fabrics Other Than Tire Cord Fabrics
- D 179-69**, Testing Cotton Tire Cords and Cord Fabrics
- D 990-58**, Recommended Practice for Interlaboratory Testing of Textile Materials
- D 1117-69**, Testing Nonwoven Fabrics
- D 1244-69**, Recommended Practice for Designation of Yarn Construction
- D 1422-69**, Test for Twist in Single Spun Yarns (Untwist-Twist Method)
- D 1573-61**, Test for Heat Aging of Asbestos Textiles
- D 1774-64**, Test for Elastic Properties of Fibers
- D 1909-68**, Table of Commercial Moisture Regains for Textile Fibers

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- D 2118 - 66**, Recommended Practice for Establishment of Standard Moisture Content for Wool and Its Products
- D 2257 - 69**, Test for Extractable Matter in Yarns
- D 2258 - 69**, Sampling Yarn for Testing
- D 2402 - 69**, Test for Water Retention of Fibers (Centrifuge Method)
- D 2462 - 69**, Test for Moisture in Wool by Distillation with Toluene
- D 2475 - 67**, Specification for Wool Felt
- D 2491 - 69**, Test for Staple Crimp in Grease Wool Locks
- D 2524 - 69**, Test for Breaking Tenacity of Wool Fibers, Flat Bundle Method— $\frac{1}{8}$ -in. Gage Length
- D 2525 - 69**, Devising a Sampling Plan for Various Forms of Wool for the Determination of Moisture Content
- D 2612 - 69**, Determination of Fiber Cohesion in Sliver and Top in Static Test
- D 2646 - 69**, Testing Backing Fabrics
- D 2720 - 69**, Recommended Practice for Calculation of Commercial Weight and Yield of Scoured Wool, Top, and Noil for Various Commercial Compositions

Approval of Revisions of American National Standards:

- D 123 - 69**; ANSI L14.12, Definitions of Terms Relating to Textile Materials
- D 204 - 69**; ANSI L14.14, Testing Sewing Threads
- D 377 - 69**; ANSI L14.49, Test for Small Amounts of Copper and Manganese in Textiles
- D 472 - 69**; ANSI L14.29, Specifications for Fineness of Wool Top and Assignment of Grade
- D 584 - 69**; ANSI L14.40, Test for Wool Content of Raw Wool-Laboratory Scale
- D 737 - 69**; ANSI L14.231, Testing Industrial Filament Yarns, Tire Cords, and Tire Cord Fabrics Made from Man-Made Organic-Base Fibers
- D 1116 - 69**; ANSI L14.196, Test for Resistance of Pile Floor Coverings to Attack by Black Carpet Beetle Larvae
- D 1334 - 69**; ANSI L14.157, Test for Wool Content of Raw Wool—Commercial Scale
- D 1381 - 69**; ANSI L14.160, Specifications for Fineness of Mohair Top and Assignment of Grade

- D 1907 - 69**; ANSI L14.139, Test for Yarn Number (Skein Method)
- D 2130 - 69**; ANSI L14.143, Test for Diameter of Wool and Other Animal Fibers by Microprojection
- D 2256 - 69**; ANSI L14.189, Test for Strength and Elongation of Yarn (Single-Strand Method)
- D 2496 - 69**; ANSI L14.155, Test for Seed Coat Fragments and Funiculi in Cotton Fiber Samples
- D 2692 - 68**; ANSI L14.237, Test for Air Wicking of Tire Fabrics

Withdrawal of American National Standards:

- D 539 - 53**; ANSI L14.117-1961, Test for Apparent Fluidity of Dispersions of Cellulose Fibers
- D 1451 - 67**; ANSI L14.134-1968, Test for Non-Lint Content of Cotton (Shirley Analyser Method)
- D 2254 - 64 T**; ANSI L14.188-1966, Test for Non-Lint Content of Cotton (SRRL Non-Lint Tester Method)
- D 2404 - 67**; ANSI L14.210-1966, Testing Jute Backing Fabrics

Reaffirmation of American National Standards:

- D 1283 - 57 (1969)**; ANSI L14.105-1960, Test for Alkali-Solubility of Wool
- D 1771 - 62 (1969)**; ANSI L14.159-1964, Sample Reweighing of Lots of Packaged Raw Wool
- D 1234 - 54 (1969)**; ANSI L14.197-1966, Sampling and Testing Staple Length of Grease Wool

ELECTION OF OFFICERS

As specified in the bylaws, the election of officers was held in the spring of 1970. The following officers were elected for a two-year term beginning July 1, 1970:

- Chairman, D. S. Hamby
- First Vice-Chairman, J. B. Curley
- Second Vice-Chairman, G. J. Lamprinakos
- Third Vice-Chairman, H. H. Ramey
- Fourth Vice-Chairman, F. J. Kovac
- General Secretary, P. J. Smith
- Membership Secretary, J. A. King
- Secretary Emeritus, H. A. Ehrman

REPORT OF COMMITTEE D-13

The officers and members of Committee D-13 regret the decision by H. A. Ehrman that he does not wish to continue actively as secretary of the committee. Mr. Ehrman has been active in the affairs of the ASTM and Committee D-13 for approximately 40 years and has made outstanding contributions to the field of test method development and standardization both in the Society and also in his employment with the U. S. Department of Commerce. We wish to take this opportunity to express our appreciation to Mr. Ehrman for the contributions which he has made to the committee and to the Society.

This past year has been one of extraordinary growth and activity in Committee D-13. A number of new projects have been initiated, particularly with reference to flammability of textile products and the care labeling of textile products. It is anticipated that additional new projects will be initiated within the coming months.

Much of this new activity and growth has been made possible by the splendid cooperation which the committee and its officers have received from the staff of ASTM Headquarters. We are particularly grateful to John

Rothrock for his assistance to the committee throughout the year and also to W. T. Cavanaugh for his interest and assistance in the development of awareness of our activities in the textile industry and the resulting increase in new membership, which has served to broaden the areas of interest and activity of the committee.

On behalf of the officers, the chairman wishes to express sincere appreciation to the members of Committee D-13 who have spent untold hours and effort during this past year in the development of new test methods and performance standards and the continual review and revision of test methods now in print. It is through such efforts as demonstrated by the members of Committee D-13 that have made it possible to develop and sustain the philosophy of voluntary standardization in this country.

Respectfully submitted on behalf of the committee,

D. S. HAMBY,
Chairman

H. A. EHRMAN,
Secretary

REPORT OF COMMITTEE D-14 ON ADHESIVES

Committee D-14 on Adhesives held two meetings during 1969: on March 27 and 28, 1969, in New Orleans, Louisiana, and on October 7 and 8 in Philadelphia, Pa. Committee D-14 consists of 134 members of whom 50 are classified as consumers, 60 as producers and 23 as general interest plus one liaison.

The subcommittee coding identification has been changed as well as some changes in subcommittee chairmen as follows:

L. H. Sharpe, Chairman Subcommittee D 14.03 Research

T. L. Wilkinson, Chairman Subcommittee D 14.04 Definitions

Gust Ilkka, Chairman Subcommittee D 14.05 Editorial Review

D. J. Kelly, Chairman Subcommittee D 14.10 Working Properties

Marco Petronio, Chairman Subcommittee D 14.20 Durability

Robert Gillespie, Chairman Subcommittee D 14.30 Wood Adhesives

No chairman, Subcommittee D 14.31 Wood Adhesives (West Coast)

D. A. Yurek, Chairman Subcommittee D 14.40 Adhesives for Plastics

C. E. Boughton, Chairman Subcommittee D 14.50 Special Adhesives

R. W. Stout, Chairman Subcommittee D 14.60 Metal Bonding Adhesives

R. E. Clemens, Chairman Subcommittee D 14.61 Metal Bonding Adhesives (West Coast)

Harold Zarky, Chairman Subcommittee D 14.70 Construction Adhesives

The 1968 election of officers are as follows:

Chairman, W. E. St. Clair

Vice-Chairman, J. T. Rice

Secretary, L. C. Jackson

Membership Secretary, R. M. Stickel

A survey of the industry was made per-

taining to the testing of plastics, hot melts, pressure sensitive adhesives, packaging, and labelling; a joint effort of Subcommittees D 14.60 and D 14.20.

The Adhesives Award was given to Harold Levine, Whittaker Corporation, San Diego, California.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 Annual Meeting, Committee D-14 presented to the Society through the Committee on Standards the following recommendations which became effective on the dates indicated:

New Standard:

D 2851 - 70, Specification for Liquid Optical Adhesive (Subcommittee V) (effective date January 22, 1970)

This specification covers a liquid optical adhesive for use in bonding glass-to-glass or other transparent adherends.

Adoption of Tentatives as Standard Without Revision

D 1183 - 70, (formerly D 1183 - 61 T), Tests for Resistance of Adhesives to Cyclic Laboratory Aging Conditions (Subcommittee III) (effective date March 19, 1970)

D 1828 - 70, (formerly D 1828 - 61 T), Rec. Practice for Atmosphere Exposure of Adhesive Bonded Joints and Structures (Subcommittee III) (effective date March 19, 1970)

D 1877 - 70, (formerly D 1877 - 61 T), Test for Permanence of Adhesive Bonded Joints in Plywood Under Mold Conditions (Subcommittee III) (effective date March 19, 1970)

D 1879 - 70, (formerly D 1879 - 61 T), Rec.

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Practice for Exposure of Adhesive Specimens to High Energy Radiation (Subcommittee D 14.10) (effective date March 19, 1970)

D 2339 - 70, (formerly D 2339 - 65 T), Test for Strength Properties of Adhesives in Two-Plywood Construction in Shear by Tension Loading (Subcommittee X) (effective date March 19, 1970)

D 2559 - 70, (formerly D 2559 - 66 T), Spec. for Adhesives for Structural Laminated Wood Products for Use Under Exterior (Wet Use) Exposure Conditions (Subcommittee X) (effective date March 19, 1970)

Revision of Standards, Immediate Adoption:

D 1151 - 69, (formerly D 1151 - 69), Test for Effect of Moisture and Temperature on Adhesive Bonds (Subcommittee III) (effective date November 14, 1969)

Revisions requested by Army materials research agency.

D 907 - 70, (formerly D 907 - 69), Definition of Terms Relating to Adhesion (Subcommittee VI) (effective date February 27, 1970)

Changed to conform with current industry practice and added new terms for blocked curing agent, curing agent, glue line, release paper, surface preparation, failure, adhesive.

Reapproval of Standards:

D 950 - 54 (1970), Test for Impact Strength of Adhesive Bonds (Subcommittee X)

D 1084 - 63 (1970), Test for Viscosity of Adhesives (Subcommittee IV)

D 1488 - 60 (1970), Test for Amylaceous Matter in Adhesives (Subcommittee X)

D 1579 - 60 (1970), Test for Filler Content of Phenol Resorcinol, and Melamine Adhesives

D 1582 - 60 (1970), Test for Nonvolatile Content of Phenol Resorcinol, and Melamine Adhesives (Subcommittee X)

D 1583 - 61 (1970), Test for Hydrogen Ion Concentration of Dry Adhesive Films (Subcommittee X)

D 1874 - 62 (1970), Spec for Water—or Solvent—Soluble Liquid Adhesives for Automatic Machine Sealing of Top Flaps of Fiberboard Shipping Cases (Subcommittee V)

D 904 - 57 (1970), Rec. Practice for Determining the Effect of Artificial (Carbon-Arc Type) and Natural Light in the Permanence of Adhesives (Subcommittee D 14.20)

D 905 - 49 (1970), Test for Strength Properties of Adhesive Bonds in Shear by Compression Loading (Subcommittee D 14.30)

D 906 - 64 (1970), Test for Strength Properties of Adhesive in Plywood Type Construction in Shear by Tension Loading (Subcommittee D 14.30)

D 1002 - 64 (1970), Test for Strength Properties of Adhesives in Shear by Tension Loading (Metal-to-Metal) (Subcommittee D 14.60)

D 1062 - 51 (1970), Test for Cleavage Strength of Metal-to-Metal Adhesive Bonds (Subcommittee D 14.60)

D 1146 - 53 (1970), Test for Blocking Point of Potentially Adhesive Layers (Subcommittee D 14.10)

D 1174 - 55 (1970), Test for Effect of Bacterial Contamination on Permanence of Adhesive Preparations and Adhesive Bonds (Subcommittee D 14.20)

D 1344 - 57 (1970), Testing Cross-Lap Specimens for Tensile Properties of Adhesives (Subcommittee D 14.30)

D 1382 - 64 (1970), Test for Susceptibility of Dry Adhesive Films to Attack by Roaches (Subcommittee D 14.20)

D 1383 - 64 (1970), Test for Susceptibility of Dry Adhesive Films to Attack by Laboratory Rats (Subcommittee D 14.20)

D 1713 - 65 (1970), Test for Bonding Permanency of Water—or Solvent—Soluble Liquid Adhesives for Automatic Machine Sealing Top Flaps of Fiberboard Specimens (Subcommittee D 14.50)

D 1714 - 65 (1970), Test for Water Absorptiveness of Fiberboard Specimens for Adhesives (Subcommittee D 14.50)

D 1779 - 65 (1970), Spec for Adhesive for Acoustical Materials (Subcommittee D 14.50)

D 1781 - 62 (1970), Climbing Drum Peel Test for Adhesives (Subcommittee D 14.60)

ACTIVITIES OF SUBCOMMITTEES

Subcommittee D 14.20 on Durability (Marco Petronio, Chairman)—A scope revi-

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sion is underway. Recommended Practices on the Durability of Adhesive Joints Stressed in Shear by Tensile Loading and Durability of Adhesive Joints Stressed in Peel is being processed for D-14 ballot. Corrosivity of Adhesives Method has been sent to Standards. Recommended Practice on Copper Corrosion by Adhesives is being processed through the subcommittee. Name of subcommittee changed from Permanence to Durability.

Subcommittee D 14.04 on Definitions (T. Wilkinson, Chairman)—The name of subcommittee changed from Nomenclature to Definitions. The following definitions were advanced to Standards: adhesive failure (n), pressure sensitive adhesive (n), blocked curing agent (n), curing agent (n), glue line (bond line) (n), release paper (n), prebond treatment (n), surface preparation (n), adherend preparation (n), and structural adhesive (n).

Subcommittee D 14.40 on Plastics (D. Yurek, Chairman)—A survey of the adhesives and plastics industry has been made on the needs for testing standards with plastics.

Subcommittee D 14.10 on Working Properties (D. J. Kelly, Chairman)—A task group has been formed to determine the need for

test methods; Method D 1084 - 63 was reapproved with an editorial change.

Subcommittee D 14.50 on Special Adhesives (C. Boughton, Chairman)—The specification for Curable Liquid Optical Adhesive was advanced to Standards. D 2181 - 64 T Vinyl Acetate Resin Emulsion Adhesive Specification was dropped.

Subcommittee D 14.30 on Wood Adhesives (R. Gillespie, Chairman)—Two methods were advanced to Standards: Test for Strength Properties of Adhesives in Two Ply Wood Construction in Shear by Tension Loading (D 2339). Specification for Adhesives for Structural Laminated Wood Products for Use Under Exterior (Wet Use) Exposure Conditions (D 2559).

Currently in Process: Specification for Protein Based Adhesives for Structural Laminated Wood Products for Use Under Interior (Dry Use) Exposure Conditions. Specification on Adhesives for Nonstructural Glued Lumber Products.

Respectfully submitted on behalf of the Committee,

W. E. ST. CLAIR
Chairman

L. C. JACKSON,
Secretary

REPORT OF COMMITTEE D-15 ON ENGINE ANTIFREEZES

Committee D-15 on Engine Antifreezes held one meeting during the year: in Washington, D. C., April 23 and 24, 1969. Advisory and subcommittee meetings were held in Cranbury, N. J. on October 21 and 22, 1969.

The committee consists of 60 participating members, representing 46 voting members, of whom 16 are classified as producers, 11 as consumers, and 19 as general interest members.

A Study Group on Antileak Testing was formed within Subcommittee IX. This group will investigate the feasibility of developing methods of test for coolant antileak agents.

A report entitled "A Study of Antifreeze Field Testers" was submitted for publication in *Materials Research and Standards*. This report compares the performance of various antifreeze testing devices, and includes a statistical analysis of round-robin testing.

Following nomination by the committee, Mr. Gus Kaufman was selected by the Society to receive the ASTM Award of Merit for his contributions to committee and Society work.

Scrolls (Resolution of Appreciation) were presented to V. O. Hatch, C. H. Sweatt, and C. M. White.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee D-15 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which became effective on the dates indicated:

New Standard:

D 2847 - 69, Recommended Practice for the Testing of Engine Coolants in Vehicle Service (Subcommittee X) (effective Dec.

19, 1969)

This recommended practice provides a procedure for evaluating corrosion protection and performance of an engine coolant in vehicle service.

AMERICAN NATIONAL STANDARDS

The following standards have been approved during the year as American National Standards by the American National Standards Institute:

D 1176 - 67; ANSI D14.4-1969, Sampling and Preparing Aqueous Solutions of Engine Antifreezes or Antirusts for Testing Purposes

ACTIVITIES OF SUBCOMMITTEES

Subcommittee III on Physical Properties (J. B. Craig, chairman) completed its work on a comparative study of antifreeze field testers.

Subcommittee IV on Chemical Properties (E. F. Harford, chairman) completed the third draft of a paper on the use and misuse of reserve alkalinity, and submitted it for balloting.

Subcommittee VI on Glassware Performance Tests (B. H. Berger, chairman) completed revision of Method D 1384, Corrosion Test of Engine Antifreezes in Glassware, and has submitted the revised method for D-15 balloting.

Subcommittee VII on Specifications (L. C. Rowe, chairman) reviewed Recommended Practice D 1880, for Selection of Engine Antifreezes for use in Automotive Cooling Systems, Ethylene Glycol, and Methanol Types, and recommended that it be reaffirmed without change. The recommendation was approved by D-15 ballot and submitted to ASTM Headquarters for action.

Subcommittee IX on Simulated Service Tests (J. G. Willard, chairman) conducted

REPORT OF COMMITTEE D-15

round-robin testing to evaluate the reproducibility of the simulated service test. It was recommended that Method D 2570, Simulated Service Corrosion Testing of Engine Antifreezes, be adopted as standard without revision. The recommendation was approved by D-15 ballot and submitted to ASTM Headquarters for action. A round-robin test is being conducted to evaluate an ultrasonic test procedure for measuring the erosion/corrosion characteristics of engine antifreezes.

Subcommittee X on Engine Dynamometer and Road Tests (E. Beynon, chairman) is

conducting a collaborative vehicle field test to evaluate the reproducibility of Recommended Practice D 2847, for Testing Engine Coolants in Vehicle Service.

This report has been submitted to letter ballot of the committee; 35 members returned their ballots, of whom 33 have voted affirmatively, and none negatively.

Respectfully submitted on behalf of the committee,

R. C. BARKER,
Chairman

C. D. WOODS,
Secretary

REPORT OF COMMITTEE

D-16 ON AROMATIC HYDROCARBONS AND RELATED CHEMICALS

Committee D-16 on Aromatic Hydrocarbons and Related Chemicals and its subcommittees held two meetings during the year: on June 25 to 27, 1969, in Atlantic City, N. J., and on Jan. 13 to 16, 1970, in Cleveland, Ohio.

The committee consists of 75 voting members of whom 37 are classified as producers, 28 as consumers, and 10 as general interest members. There are, in addition, 11 official members - alternates and 6 consulting members.

J. B. Himes has been appointed chairman of Subcommittee J on Handling and Sampling.

The committee notes with regret the death of member W. J. Sweet.

The committee celebrated its 25th anniversary by holding a Silver Anniversary Luncheon in Atlantic City, N. J., June 26, 1969. A silver plaque to commemorate the occasion was presented to Society President H. N. Bogart.

Officers elected for a term of two years are:

Chairman, K. M. Brown
Vice-Chairman, D. B. Griffin
Secretary, R. G. White

RECOMMENDATIONS ACCEPTED BY THE COMMITTEE ON STANDARDS

Subsequent to the 1969 annual report, Committee D-16 presented to the Society through the Committee on Standards the following recommendations which became effective on the dates indicated:

New Tentatives:

D 2826 - 69 T, Specification for Styrene Monomer 993 (Subcommittee A) (effective July 16, 1969)

This specification covers a grade of sty-

rene monomer identified as Styrene Monomer 993.

D 2827 - 69 T, Specification for Styrene Monomer 996 (Subcommittee A) (effective July 16, 1969)

This specification covers a grade of styrene monomer identified as Styrene Monomer 996.

D 2870 - 70 T, Method of Test for Gel Time of Tar Acids (Subcommittee C) (effective March 19, 1970)

Covers the determination of gel time of tar acids in the range from 5 to 120 min.

D 2871 - 70 T, Specification for Para Tertiary Butylphenol 98 (Subcommittee C) (effective March 19, 1970)

Covers the specification for para tertiary butylphenol.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee D-16 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which became effective on the dates indicated:

Tentative Adopted as Standard Without Revision:

D 2359 - 69 (formerly D 2359 - 66 T), Specification for Refined Benzene 535 (Subcommittee A) (effective Sept. 19, 1969)

Tentative Adopted as Standard with Revision:

E 300 - 69 (formerly E 300 - 68 T), Recommended Practice for Sampling Indus-

REPORT OF COMMITTEE D-16

trial Chemicals (Subcommittee J) (effective Sept. 19, 1969)

Jurisdiction over this standard is exercised jointly with Committee E-15.

Revision of Standards, Immediate Adoption: D 850 - 69 (formerly D 850 - 56), Method of Test for Distillation of Industrial Aromatic Hydrocarbons and Related Materials (Subcommittee A) (effective June 26, 1969)

Section 3 on Sample was changed.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee A on Monocyclic Hydrocarbons (D. B. Griffin, chairman)—New task groups have been formed to develop standards for ethylbenzene and isopropylbenzene, and to develop a gas chromatographic test to replace Method D 851, Test for Paraffins in Industrial Aromatic Hydrocarbons. Other task groups are working on gas chromatographic methods for purity of styrene and for percent benzene in cyclohexane. Coulometric approaches to trace sulfur and chlorine determinations are being studied. A precision statement has been developed for a new pounds-per-gallon hydrometer method for density of monocyclic hydrocarbons.

Subcommittee B on Polycyclic Hydrocarbons (R. F. Shertzer, chairman)—The task group on gas chromatography of refined naphthalene will conduct collaborative testing restricted to chromatograms equipped with flame-ionization detectors. The task group on a Sulfur Method for Naphthalene is studying a method that uses Raney Nickel to decompose the sample.

Subcommittee C on Phenolic Compounds (D. F. Pontz, chairman)—The task group on Bisphenol A is working on methods for ash, color, iron, phenol, solidification point, and water. A new task group on Carbolates has been formed. (Carbolate solutions are the spent alkaline solutions containing phenolic material which are derived from treatment of distillate stocks during the refining of petroleum. The recovered phenolic material is a source of commercial grades of phenol, cresol, and xylenol mixtures. If not recovered, these phenolic materials present a waste disposal problem.)

Subcommittee D on Nitrogen Heterocyclics (R. F. Shertzer, chairman) is seeking to determine the extent of interest in the development of standards for aniline.

Subcommittee E on Thermometry (A. C. Naso, chairman) has been requested to consider changing its title, scope, and personnel so as to be able to provide expert counsel to the rest of the committee on all kinds of physical testing that affect Committee D-16 standards.

Subcommittee F on Editorial and Nomenclature (E. T. Scafe, chairman) serves as a consultant body to Committee D-16 on editorial and nomenclature matters, and prepares or reviews definitions of terms used in the committee's standards.

Subcommittee G on Statistical Procedure (S. A. Murray, chairman) acts as a consultant group on statistical problems; reviews the adequacy of all precision statements in D-16 standards; provides guidance in computer calculation of precision; and provides liaison with Committee E-11 on Statistical Methods.

Subcommittee H, USA Group for ISO/TC 78 (K. M. Brown, chairman) was formally dissolved on Jan. 13, 1970.

Subcommittee I on Carboxylic Acids and Their Derivatives (M. J. Gavala, chairman) has an active task group developing a specification and test methods for maleic anhydride. The subcommittee is attempting to determine the extent of interest in standards for adipic, fumaric, and succinic acids; it is also considering whether a method of test for benzoic acid in phthalic anhydride is needed.

Subcommittee J on Handling and Sampling (J. B. Himes, chairman) has task groups working on draft procedures for sampling and handling monocyclic hydrocarbons (benzene, toluene, xylene, cyclohexane, and styrene), molten naphthalene, solid naphthalene, maleic anhydride, and pyridines. The subcommittee has collaborated with Committee E-15 in the revision of Recommended Practice E 300, for Sampling Industrial Chemicals.

Respectfully submitted on behalf of the committee.

K. M. BROWN,
Chairman

R. G. WHITE,
Secretary

REPORT OF COMMITTEE D-17 ON NAVAL STORES

Subcommittee D-17 on Naval Stores held one meeting during the year in joint session with the Pulp Chemical Association. The meeting was held on May 26 to 27, 1970, in Atlanta, Ga. Eleven members were present.

Current membership in Committee D-17 consists of 20 members of whom 19 are voting members. Of the voting members 8 are classified as producers, 6 as consumers, and 5 as general interest.

On Sept. 24, 1969, Walter J. Sweet passed away. He had served this committee loyally and well as secretary since 1964. In October, Dr. R. T. Hall was designated as the Hercules representative on this committee, and at the request of Ray Lawrence, chairman, agreed to serve as acting secretary.

A special Nominating Committee (J. J. McBride, Jr., chairman) reported their recommendations for a slate of officers for the next term; there were no nominees from the floor. The following were nominated and subsequently elected by unanimous vote:

Chairman, R. V. Lawrence

Vice-Chairman, R. W. Gressang

Secretary, R. T. Hall

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Revision of Standard:

- D 509 - 70** (formerly D 509 - 55), Sampling and Grading of Rosin (Main Committee D-17) (effective Jan. 22, 1970)

Reapproval of Standards:

- D 13 - 65 (1970)**, Specifications for Spirits of Turpentine (Subcommittee V)
D 233 - 65 (1970), Sampling and Testing Turpentine (Subcommittee II)
D 269 - 52 (1970), Test for Toluene Insoluble Solid Matter in Rosin (Subcommittee I)

- D 464 - 59 (1970)**, Test for Saponification Number of Rosin (Subcommittee I)

- D 465 - 59 (1970)**, Test for Acid Number of Rosin (Subcommittee I)

- D 801 - 57 (1970)**, Sampling and Testing Dipentene (Subcommittee II)

- D 802 - 57 (1970)**, Sampling and Testing Pine Oil (Subcommittee II)

- D 803 - 65 (1970)**, Testing Tall Oil (Subcommittee III)

- D 804 - 63 (1970)**, Definitions of Terms Relating to Naval Stores and Related Products (Subcommittee IV)

- D 856 - 49 (1970)**, Sampling and Testing Pine Tars and Pine-Tar Oils (Main Committee D-17)

- D 889 - 58 (1970)**, Test for Volatile Oil in Rosin (Subcommittee I)

- D 890 - 58 (1970)**, Test for Water in Liquid Naval Stores (Subcommittee II)

- D 1063 - 51 (1970)**, Test for Ash in Rosin (Subcommittee I)

- D 1064 - 58 (1970)**, Test for Iron in Rosin (Subcommittee I)

- D 1065 - 56 (1970)**, Test for Unsaponifiable Matter in Rosin (Subcommittee I)

- D 1131 - 53 (1970)**, Methods of Testing Rosin Oils (Main Committee D-17)

- D 1240 - 54 (1970)**, Method of Test for Rosin Acids in Fatty Acids (Subcommittee III)

- D 1585 - 63 (1970)**, Methods of Test for Fatty Acids Content of Tall Oil Rosin (Subcommittee I)

ACTIVITIES OF SUBCOMMITTEES

Subcommittee I on Rosin (J. J. McBride, Jr., chairman)—*Determination of Rosin in Alkyd Resins*—no further work has been done on this determination, which has been deemed unsatisfactory, and no further recommendations have been made. However, a joint task group of Pulp Chemicals Associa-

REPORT OF COMMITTEE D-17

tion Technical Committee and ASTM Committees D-1 and D-17 has had discussions with the appropriate Government Agency, and data were presented on the performance in paints of low rosin tall oil fatty acid alkyds compared with presently approved alkyds. The comparison is quite favorable, and it appears likely that existing ASTM methods may be suitable for the Government's requirements. This development is being actively followed up.

Subcommittee VI on Analysis of Turpentine (Dwight Leavens, chairman) reported on the gas chromatographic method for analysis of turpentine. On the basis of inter-laboratory work and the results of the recent round-robin, the method is believed to be

satisfactory. In order to include a proper precision statement, some additional data completed, but not yet reported, needs to be included. As soon as this is taken care of and the data processed, it is expected that the method will be ready for circulation for approval by letter ballot.

Subcommittees II, III, IV, and V—No action during the year.

This report has been submitted to letter ballot by the members of Committee D-17.

Respectfully submitted on behalf of the committee,

R. V. LAWRENCE,
Chairman

R. T. HALL,
Secretary

REPORT OF COMMITTEE D-18 ON SOIL AND ROCK FOR ENGINEERING PURPOSES

Committee D-18 on Soil and Rock for Engineering Purposes and its Executive Subcommittee held two meetings: one in connection with the Winter Meeting in Denver, Colo., on Feb. 7, 1969, and the other at the Annual Meeting of the Society on June 22 to 27, 1970, in Atlantic City, N. J. The subcommittees of Committee D-18 held one meeting at the Annual Meeting of the Society.

The committee consists of 169 voting members, of whom 32 are classified as producers, 40 as consumers, and 97 as general interest members. The committee has 5 honorary and 2 consulting members.

The revised scope of Committee D-18 set forth in the last annual report was approved by letter ballot of the committee and submitted to the ASTM Board of Directors, who approved it on Jan. 20, 1970. A minor editorial revision was made in the first sentence of the second paragraph, causing it to read "soil and rock as engineering materials."

In view of the expanded scope of Committee D-18, it was decided to increase the scope of the C. A. Hogentogler Award to include papers on rock subjects as well as on soils.

A two-session informal *Symposium on Determination of the In-Situ Modulus of Deformation of Rock* was held on Feb. 6, 1969, at Denver, Colo.; cochairmen were D. U. Deere and E. J. Deklotz. A one-session *Symposium on Information Retrieval and Data Automation* was held on June 24, 1969, at Atlantic City, N. J.; chairman was W. T. Waterhouse.

ASTM STP 444, Performance of Deep Foundations, March 1969, and *ASTM STP 450, Vibration Effects of Earthquakes on Soils and Foundations*, April 1969, were published by the Society under the sponsorship of Committee D-18.

All material to go in the publication *Special Procedures for Testing Soil and Rock for Engineering Purposes* was sent to the Society for editing and printing.

Cooperation was initiated with the Soils Subcommittee of the Society's Board of Directors Committee on Materials Inspection and Testing Laboratories to produce a document of recommended practice for soils inspection and testing.

The Hogentogler Award for 1969 was presented to E. L. Matyas for his paper "Air and Water Permeability of Compacted Soils." W. G. Holtz, past chairman of Committee D-18, was presented the Society's Award of Merit. Honorary membership in Committee D-18 was presented to C. B. Crawford. G. B. Wallace was presented the Special Service Award of the committee.

The committee notes with regret the passing of an esteemed colleague, E. J. Kilcawley, who served as chairman of the committee from 1945 to 1960 and was very active in committee affairs. Other committee members who died during the year were R. K. Bernhard, A. A. Maxwell, and L. A. Tomes.

The following have been appointed chairmen:

R. Lundgren, Subcommittee D18.94 on Environmental and Prototype Testing Procedures

R. H. Howe, Subcommittee D18.02 on Sampling and Related Field Testing for Soil Investigation

N. O. Schmidt, Subcommittee D18.06 on Physico-Chemical Properties of Soils and Rocks

M. C. Anday, Section D18.08.06 on Stabilization with Lime and Other Admixtures

G. F. Weissmann, Subcommittee D18.10 on Bearing Tests of Soils in Place

E. D'Appolonia, Subcommittee D18.11 on Deep Foundations

C. B. Crawford, Subcommittee D18.97 on Special Awards

The following have been named as Committee D-18 representatives on other committees:

B. O. Hardin, Committee E-1, Subcommittee 5 on Compression Testing

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E. T. Selig, Committee E-1, Subcommittee 7 on Impact Testing

M. R. Thompson, Committee E-1, Subcommittee 8 on Flexural Strength Test

T. W. Van Zelst, Committee E-1, Subcommittee 21 on Metalware Laboratory Apparatus

The following members of Committee D-18 have been named as Society representatives on other committees:

W. A. Goodwin, Highway Research Board, National Research Council

A. I. Johnson, American National Standards Committee 284 on Glossary of Environmental Terms

The following officers and members of the Executive Subcommittee have been elected to assume office at the close of the 1970 Annual Meeting:

Chairman; E. B. Hall (2-year term)

First Vice-Chairman; B. S. Coffman (2-year term)

Second Vice-Chairman; A. I. Johnson (2-year term)

Secretary; W. G. Shockley (2-year term)

Membership Secretary; J. W. Guinee (2-year term)

Executive Subcommittee; E. D'Appolonia (6-year term)

Executive Subcommittee; E. T. Selig (6-year term)

Executive Subcommittee; R. H. Karol (unexpired term of A. I. Johnson, 4-year term)

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee D-18 submitted the following recommendations to the Society for action under the Interim Procedure for Standards which were accepted by the Society effective on the dates indicated:

New Standards:

D 2844 - 69, Method of Test for Resistance R-Value and Expansion Pressure of Compacted Soils (Subcommittee D18.08) (Effective Dec. 18, 1969)

This method covers the procedure for testing both treated and untreated laboratory compacted soils or aggregates with the stabilometer and expansion-pressure devices to obtain results indicative of performance

when placed in the base, subbase, or subgrade of a road subjected to traffic.

D 2845 - 69, Method for Laboratory Determination of Pulse Velocities and Ultrasonic Elastic Constants of Rock (Subcommittee D18.12) (effective Dec. 19, 1969)

The first part of this method describes equipment and covers procedures for laboratory measurements of the ultrasonic pulse velocities of compression waves and shear waves. The method is valid for wave velocity measurement in both anisotropic and isotropic rocks, although the velocities obtained in grossly anisotropic rocks may be influenced by such factors as direction, travel distance, and diameter of transducer. The remaining part of this method concerns the determination of elastic constants of rock.

D 2850 - 70, Method of Test for Unconsolidated, Undrained Strength of Cohesive Soils in Triaxial Compression (Subcommittee D18.05) (effective March 6, 1970)

This method covers the determination of the unconsolidated, undrained strength of cylindrical specimens of cohesive soils in the undisturbed and remolded conditions, using either strain-controlled or stress-controlled application of the axial compressive test load where the specimen is subjected to an all around pressure in a triaxial chamber.

D 2901 - 70, Method of Test for Cement Content of Freshly Mixed Soil-Cement (Subcommittee D18.08) (effective Aug. 14, 1970)

This method covers the determination of the cement content of soil-cement mixtures from a construction project.

Adoption of Tentatives as Standards Without Revision:

D 425 - 69 (formerly D 425 - 67 T), Centrifuge Moisture Equivalent of Soils (Subcommittee D18.03) (effective Sept. 19, 1969)

D 698 - 70 (formerly D 698 - 66 T), Moisture-Density Relations of Soils Using 5.5-lb Rammer and 12-in. Drop (Subcommittee D18.03) (effective Jan. 22, 1970)

D 1557 - 70 (formerly D 1557 - 66 T), Moisture-Density Relations of Soils Using 10-lb Rammer and 18-in. Drop (Subcommittee D18.03) (effective Jan. 22, 1970)

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D 2419 - 69 (formerly D 2419 - 65 T), Sand Equivalent Value of Soils and Fine Aggregate (Subcommittee D18.08) (effective Dec. 18, 1969)

Adoption of Tentatives as Standards with Revision:

D 420 - 69 (formerly D 420 - 65 T), Recommended Practice for Investigating Soils and Rock for Engineering Purposes (Subcommittee D18.01) (effective Dec. 18, 1969)

This consists of a substantial revision and broadening of the scope from highways to all engineering work.

D 1143 - 69 (formerly D 1143 - 61 T), Method of Test for Load-Settlement Relationship for Individual Vertical Piles Under Static Axial Load (Subcommittee D18.11) (effective Nov. 7, 1969)

This method was withdrawn in 1968 and was substantially revised prior to reinstatement in 1969.

D 2487 - 69 (formerly D 2487 - 66 T), Method for Classification of Soils for Engineering Purposes (Subcommittee D-18.07) (effective Nov. 14, 1969)

The revision to this method consisted of updating.

D 2488 - 69 (formerly D 2488 - 66 T), Recommended Practice for Description of Soils (Visual-Manual Procedure) (Subcommittee D18.07) (effective Dec. 19, 1969)

The revision consisted of the addition of Section 7.5.1. and the renumbering of Notes 7 and 8 as Notes 8 and 9.

Reapproval of Standard:

D 1558 - 63 (1969), Moisture-Penetration Resistance Relations of Fine-Grained Soils

AMERICAN NATIONAL STANDARDS

The following standard was approved dur-

ing the year as American National standard by the American National Standards Institute:

D 425 - 69, ANSI A37.46-1970, Centrifuge Moisture Equivalent of Soils

The following standards were recommended during the year to be submitted for approval as American National Standards by the American National Standards Institute:

D 698 - 70, Test for Moisture-Density Relations of Soils, Using a 5.5-lb Rammer and 12-in. Drop

D 1195 - 64, Repetitive Static Plate Load Tests of Soils and Flexible Pavement Components, for Use in Evaluation and Design of Airport and Highway Pavements

D 1196 - 64, Nonrepetitive Static Plate Load Tests of Soils and Flexible Pavement Components, for Use in Evaluation and Design of Airport and Highway Pavements

D 1411 - 69, Test for Water-Soluble Chlorides Present as Admixes in Graded Aggregate Road Mixes

D 1557 - 70, Test for Moisture-Density Relations of Soils, Using 10-lb Rammer and 18-in. Drop

D 1558 - 63 (1969), Test for Moisture-Penetration Resistance Relations of Fine-Grained Soils

D 2049 - 69, Test for Relative Density of Cohesionless Soils

D 2113 - 62 T, Diamond Core Drilling for Site Investigations

D 2419 - 69, Test for Sand Equivalent Value of Soils and Fine Aggregate

D 2435 - 65 T, Test for One-Dimensional Consolidation Properties of Soils

D 2487 - 69, Classification of Soils for Engineering Purposes

D 2488 - 69, Recommended Practice for Description of Soils (Visual-Manual Procedure)

D 2844 - 69, Test for Resistance R-Value and Expansion Pressure of Compacted Soils

D 2845 - 69, Laboratory Determination of Pulse Velocities and Ultrasonic Elastic Constants of Rock

D 2850 - 70, Test for Unconsolidated, Undrained Strength of Cohesive Soils in Triaxial Compression

REPORT OF COMMITTEE D-18

ACTIVITIES OF SUBCOMMITTEES

Subcommittee D18.91, Editorial (W. C. Hill, chairman) reviewed nine proposed methods for editorial format and clarity. One statistical study was completed.

Subcommittee D18.93 on Nomenclature for Soil and Rock Mechanics (A. I. Johnson, chairman) has balloted in subcommittee soil mechanics and soil dynamics terms for revisions, deletions, and additions preparatory to Committee D-18 ballot. The chairman prepared a Report of the United States ASCE-ASTM Joint Committee on Nomenclature for Soil Mechanics and Foundation Engineering as the U. S. position on soil nomenclature, for presentation at the Specialty Session on Terminology and Definitions in Soil Mechanics at the Seventh International Conference on Soil Mechanics and Foundation Engineering, Mexico City, Mexico, in August 1969.

Subcommittee D18.94 on Environmental and Prototype Testing Procedures (R. Lundgren, chairman) is concerned with reviewing new and old standards sponsored by Committee D-18 in reference to environmental and prototype factors that should be considered in each standard. The subcommittee desires to have representatives appointed from each of the 12 research and standards subcommittees of Committee D-18.

Subcommittee D-18.95 on Information Retrieval and Data Automation (W. T. Waterhouse, chairman) sponsored a Symposium on Information Retrieval and Data Automation at the Annual Meeting in June 1969. The subcommittee has continued to cooperate with the Committee on Information Retrieval of the Soil Mechanics and Foundations Division of the American Society of Civil Engineers in publication of the International Abstracts Section of the Journal. Efforts are being made to increase the membership of the subcommittee through canvass of Committee D-18 membership.

Subcommittee D18.01 on Surface and Sub-surface Reconnaissance (C. P. Fisher, chairman) completed editorial work on papers to be included in the forthcoming book *Special Procedures for Testing Soil and Rock for Engineering Purposes*. A proposed reorganization of the subcommittee into seven sections has been planned, and it is proposed to implement the new organization and assign work tasks at the 1970 Annual Meeting.

Subcommittee D18.02 on Sampling and Related Field Testing for Soil Investigation (R. H. Howe, chairman) submitted five procedures for inclusion in the forthcoming *Special Procedures for Testing Soil and Rock for Engineering Purposes*. Plans were developed for a Symposium on Sampling of Soil and Rock to be presented at the 1970 Annual Meeting in Toronto. Suggestions were solicited for a proposed Symposium on Underwater Sampling and Construction Control for the 1971 Annual Meeting. Method D 2113 - 62 T, Diamond Core Drilling for Site Investigation, was balloted in Committee D-18 for approval as standard and a report of submission was sent to Society Headquarters. A revised version of Method D 2573 - 67 T, Field Vane Shear Test in Cohesive Soil, was balloted in subcommittee preparatory to Committee D-18 ballot. Results of the Committee D-18 ballot on the proposed Recommended Practice for Subsurface Exploration Recording were being studied for resolution of comments accompanying negative votes. Work is under way on development of methods for moisture and density determinations by nuclear methods in boreholes and measurement of groundwater level in boreholes. Suggestions have been made for development of methods for correlating results of split spoon penetration tests using different size samplers, sampling of organic soils and peats, and sampling of weathered rock.

Subcommittee D18.03 on Texture, Plasticity, and Density Characteristics of Soils (J. E. Mitchell, chairman) worked on combining Method D 421 - 58 (1965), Dry Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants, and Method D 2217 - 66, Wet Preparation of Soil Samples for Grain-Size Analysis and Determination of Soil Constants, into one test method. Changes and revisions are being studied for Methods D 422 - 63, Particle-Size Analysis of Soils, D 423 - 66, Test for Liquid Limit of Soils, and D 854 - 58 (1965), Specific Gravity of Soils. An alternative test method for Method D 427 - 61 (1967), Test for Shrinkage Factors of Soils, is being studied. A method of test for compaction of soils using the Harvard miniature compaction device is being prepared. A task force continued to investigate problems occurring with Method D 2168 - 66, Calibration of Mechanical Laboratory Soil Compactors.

REPORT OF COMMITTEE D-18

Subcommittee D18.04 on Permeability and Capillarity Properties of Soils (A. I. Johnson, chairman) submitted proposed Methods of Test for Infiltration Rate in Field Using Ring Infiltrometers and Capillary-Moisture Relationships for Soils (1 to 15 Atmospheres) to Committee D-18 letter ballot for immediate adoption as standard. The subcommittee is examining and attempting to resolve negative comments resulting from the balloting. Development of methods for the following are being considered: flow-net preparation, resistance network analog model, field pore-pressure measurement, capillary-wetting properties, and field aquifer tests.

Subcommittee D18.05 on Structural Properties of Soils (E. B. Hall, chairman)—Method D 2435 – 65 T, Test for One-Dimensional Consolidation Properties of Soils, was balloted in Committee D-18 and by the Society for adoption as standard and submittal to American National Standards Institute; one negative vote from the Society ballot is being considered by the subcommittee. A proposed Method of Test for Direct Shear Test of Soils Under Consolidated Drained Conditions was balloted in Committee D-18 for adoption as standard and submitted to American National Standards Institute.

Subcommittee D18.06 on Physico-Chemical Properties of Soils and Rocks (N. O. Schmidt, chairman)—Since the June 1969 meeting, efforts have been expended in preparing methods for the forthcoming edition of *Special Procedures for Testing Soil and Rock for Engineering Purposes*. The following four methods were prepared and submitted:

- Proposed Tentative Method of Test for Organic Matter Content of Soils by Redox Titration, submitted by Wallace Rankin, Rankin Testing Laboratory, Omaha, Nebr.
 - Suggested Method of Test for Determination of Soluble Salts in Soil, submitted by R. T. Martin, Massachusetts Institute of Technology
 - Suggested Method of Determination of Organic Carbon Content of Soil, submitted by N. O. Schmidt, University of Missouri-Rolla
 - Suggested Method for Estimating Specific Surface, submitted by a task group of Subcommittee D18.06
- Future plans of the subcommittee include

determining the need for and developing a test for thermal properties of soil.

Subcommittee D18.07 on Identification and Classification of Soils (T. H. Thornburn, chairman) took an active interest in the forthcoming edition of *Special Procedures for Testing Soil and Rock for Engineering Purposes* and was able to obtain a revised version of the Michigan State Highway Department Procedure for Pedological Classification of Soils and two new inclusions, A Review of Engineering Soil Classification System, by T. K. Liu, and Guide to Field Description of Muskeg, by I. C. MacFarlane. The subcommittee is presently adapting AASHTO Standard M-145-66I, Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes, as an ASTM standard. Because of the interim nature of the revised version of M-145, there is a question whether final action should be taken on this matter before AASHTO has accepted it.

Subcommittee D18.08 on Special and Construction Control Tests (B. S. Coffman, chairman)—A proposed Method of Test for Density of Soil in Place by the Drive-Cylinder Method was balloted in Committee D-18 for adoption as standard and submittal to the American National Standards Institute; comments accompanying negative votes are being studied by the subcommittee. Method D 2901, Test for Cement Content of Freshly Mixed Soil-Cement was adopted as standard and will be submitted to the American National Standards Institute. A proposed new Method of Test for Determining the Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth) was balloted in Committee D-18 for adoption as standard and submittal to the American National Standards Institute; comments accompanying negative votes are being studied. Development of a test method to determine the bitumen content of stabilized soils was referred to Committee D-4 in consideration of that committee's willingness to complete its development. The subcommittee is developing a method of test for determining moisture content at shallow depth by nuclear methods.

Subcommittee D18.09 on Dynamic Properties of Soils (E. T. Selig, chairman) prepared and submitted the following reports to Committee D-18 for inclusion in the new

REPORT OF COMMITTEE D-18

Special Procedures for Testing Soil and Rock for Engineering Purposes:

Method of Test for Some Viscoelastic Properties of Materials, Especially Frozen and Nonfrozen Soils, Under Vibratory Loads, by H. W. Stevens, U. S. Army Cold Regions Research and Engineering Laboratory

Suggested Methods of Test for Shear Modulus and Damping of Soils by the Resonant Column, by B. O. Hardin, University of Kentucky

Determination of Soil Shear Moduli by *In-situ* Vibratory Techniques, by G. F. Weissmann, Bell Telephone Laboratories, Inc.

A summary of existing test methods relating to soil dynamics is being compiled in order to provide a basis for selecting test procedures which should be prepared by this subcommittee.

The revised list of terms and definitions pertaining to soil dynamics was submitted to subcommittee ballot. Most of the terms were approved; the remaining negative votes are being reviewed and a second ballot is anticipated prior to the 1970 meeting.

Other subjects being considered include a method for evaluating stress gage performance, effects of vibration on densification of soils, and cyclic load tests to determine modulus and strength of soils.

Subcommittee D18.10 on Bearing Tests of Soils in Place (G. F. Weissmann, chairman) is balloting in subcommittee revisions to Method D 1194 - 57, Test for Bearing Capacity of Soil for Static Load on Spread Footings, to resolve negative votes and comments from Committee D-18 balloting. Also being balloted in subcommittee are recommendations to reapprove Method D 1195 - 64, Repetitive Static Plate Load Tests of Soils and Flexible Pavement Components, for Use in Evaluation and Design of Airport and Highway Pavements, and Method D 1196 - 64, Nonrepetitive Static Plate Load Tests of Soils and Flexible Pavement Components, for Use in Evaluation and Design of Airport and Highway Pavements. Work is continuing on revisions to Method of Test for Bearing Ratio of Soils in Place to resolve negative votes and comments from Committee D-18 balloting. Method of Test for Determination of Load-Deflection Characteristics of Pavement Systems by Means

of the Benkelman Beam is to be included in the publication *Special Procedures for Testing Soil and Rock for Engineering Purposes*.

Subcommittee D18.11 on Deep Foundations (E. D'Appolonia, chairman) has continued work on the following test procedures preparatory to submitting them to committee letter ballot:

Load-Deflection Relationship for Individual Piles Using a Constant Rate of Penetration

Load-Deflection Relationship of Pile Groups

Load-Deflection Relationship for Individual Piles Under Axial Tensile Load

Load-Deflection Relationship for Individual Piles Under Lateral Load

Load-Deflection Relationship for a Batter Pile Frame Under Lateral Load

Subcommittee D18.12 on Rock Mechanics (E. J. Deklotz, chairman) processed papers submitted to the informal *Symposium on Determination of the In-Situ Modulus of Deformation of Rock* (Winter Meeting, Denver, February 1969) to Society Headquarters for publication. Proposed methods of test for Direct Tensile Strength of Rock Core Specimens and Unconfined Compressive Strength of Rock Core Specimens were submitted for Committee D-18 ballot for adoption as standards. A proposed Method of Test for Holding Strength of Rock Bolt Anchorage by Field Pull Tests has been balloted in subcommittee and is being revised prior to submittal to Committee D-18 letter ballot. A proposed Method for Classification of Rock Core Specimens on the Basis of Compressive Strength and Young's Modulus is being developed. The subcommittee is cooperating with Subcommittee D18.93 in updating definitions of rock terms in Definitions D 653 - 67, Terms and Symbols Relating to Soil and Rock Mechanics. Preparation of a compendium of rock mechanics *in-situ* instrumentation is in progress. The subcommittee is initiating cooperation with Subcommittee XXVI of Committee A-1 on preparation of a standard specification for rock bolts.

Respectfully submitted on behalf of the committee,

A. A. WAGNER,
Chairman

W. G. SHOCKLEY,
Secretary

REPORT OF COMMITTEE D-19 ON WATER

Committee D-19 on Water held meetings on June 16 to 20, 1969, in Philadelphia, Pa., and on Jan. 13 to 16, 1970, in Fort Lauderdale, Fla.

PART 1, PROPOSED SINGLE VOLUME OF WATER STANDARDS

T. A. Marshall, Jr., the late Managing Director of ASTM, undertook to negotiate with the executive secretaries of the American Public Health Assn., Inc., the American Water Works Assn., and the Water Pollution Control Federation, the possibility of publication in a single volume of the methodology on water, currently published by ASTM in the *Annual Book ASTM Standards*, Part 23, and *Standards Methods for the Examination of Water*, published by APHA, Inc.

Consideration was given to the eight principles that follow:

1. The standards growing out of the activities of all four societies are to be published in a single book with the individual standards not having any identification or credit to specific individual organizations, but published as standards with the unanimous agreement of all four societies.

2. Those methods on which there is not unanimous agreement will be published in a separate section or with a separate identification. It is our suggestion that these be published in a green section following the approved standards and with footnoted identification as to which societies have endorsed them or recommend their use.

3. A special steering committee should be appointed to plan the operating details, organization, and timing, possibly leading to an ultimate merger of the committees of each of the four organizations into a single joint committee. This special steering committee would consist of the Joint Editorial Board plus the executive directors of the four societies.

4. Announcement of the new agreement and time schedule for its accomplishment should be published appropriately in both the 13th edition of *Standard Methods* (1970) and in the *1970 Annual Book of ASTM Standards*, Part 23, to be issued in October 1970.

5. Plans should be commenced by mid-summer for the first joint book, with a target date of 1972. (There is some doubt as of this date that the 1972 target can be met.)

6. The frequency of publication is to be substantially increased over the 5-year cycle currently in effect for *Standard Methods*. The determination as to whether or not an annual or biennial cycle is practical will be made following the 1972 edition, and will depend upon the proportion of new and revised material available for the next following edition. If the new or revised material is limited in quantity it can be handled as an annual supplement with biennial publication. If the revised and new material is comparable to ASTM's current experience, then the cycle could be an annual cycle.

7. A new joint editorial board should be appointed for the 1972 edition as soon as practical with the responsibility to determine format to be used and organize appropriate subcommittees together with schedules for the review and development of material to be included in the 1972 edition.

8. Agreement should be reached on a common format. This would be the responsibility of the new joint editorial board. (The committee should point out here that with the publication of these standards in *Standard Methods* only, and not in other parts of the *Annual Book of ASTM Standards*, it would not be necessary to firmly insist on the ASTM format.) Agreement was reached that in the decision as to format, the new joint editorial board would invite the advice of

REPORT OF COMMITTEE D-19

representatives of appropriate government agencies.

Approvals to the principles were secured from Committee D-19 on June 20, 1969, followed by the ASTM Board of Directors, and by the boards of directors of APHA, Inc., AWWA, and WPCF.

The agencies that publish methods for the examination of water, principally include the four above mentioned societies, as well as a number of Federal agencies with interests in this area.

The preparation of methods published up to the 13th edition of *Standard Methods* is supervised by the Joint Editorial Board, whose members include the respective chairmen of the methods committees of APHA, AWWA, and WPCF. This board will be enlarged to include an ASTM representative, currently Dr. M. W. Skougstad.

The initial meeting of the enlarged Joint Editorial Board was held on Sept. 16 and 17, 1969. The minutes of the meeting were reviewed by the Subcommittee D-19.1 and a number of questions resulted.

The ASTM Managing Director advised Committee D-19 that further discussions would be entered into by him with the counterpart executive secretaries to secure guide lines and stated objectives acceptable to all concerned.

PART 2, COMMITTEE D-19 ACTIVITIES

E. E. Coulter, Power Generation Division of Babcock and Wilcox Co., Barberton, Ohio was presented with the 1970 Max Hecht Award, certificate and citation on Jan. 14, 1970, in Fort Lauderdale, Fla. The presentation was made by F. E. Clarke, a member of the ASTM Board of Directors.

J. K. Rice received the ASTM Award of Merit certificate on June 24, 1970.

The committee continues to operate with one administrative and eight technical subcommittees. The committee scope and the organization of the technical subcommittees with their respective sub-divisions will be found in the current *ASTM Yearbook*.

The committee prepared, the society accepted, and has published in the 1969 *Annual Book of ASTM Standards*, Part 23, a total of 95 standards and 11 tentatives.

All of the technical subcommittees are reviewing standards, updating the contents to

conform with current technology. Numerous new projects are being developed, those methods to be offered to the society for acceptance as tentatives.

The Standards Advisor of the committee distributed to the subcommittee chairmen a supply of copies of Recommended Procedures for Drafts, to secure the desired format for the presentation of the committee's methods.

The *Manual on Water*, 1st edition of *ASTM Special Technical Publication No. 442* was published by the Society late in 1969. This publication has been expanded to 14 chapters. Various chapters that were published in the 2nd edition of the *Manual on Industrial Water and Industrial Waste Water* were revised and updated to meet current technology, and new chapters were added. The following is a list of chapter titles:

- Chapter I. Water Sources and Supply
 - Chapter II. Uses of Industrial Water
 - Chapter III. Effects of Composition on Industrial Water Reuse
 - Chapter IV. Treatment of Process Water and Waste Water
 - Chapter V. Technology of Industrial Water Reuse
 - Chapter VI. Self-Purification and Other Natural Quality Recovery Mechanisms
 - Chapter VII. Thermal Loading of Water Supplies
 - Chapter VIII. Sampling and Flow Measurement of Industrial Water
 - Chapter IX. Subjective Examination of Water
 - Chapter X. Analysis of Industrial Water and Industrial Waste Water
 - Chapter XI. Instrumental Monitoring of Water Quality
 - Chapter XII. Sampling and Instrumental Identification of Water-Formed Deposits
 - Chapter XIII. Chemical Analysis of Water-Formed Deposits
 - Chapter XIV. Radioactive Nuclides in Water
- Material is being developed for additional chapters to be included in the 2nd edition.

The committee at its meeting on Jan. 16, 1970, approved the nominations for the committee officers. They were elected by letter ballot and will serve the two-year term ending at the close of the Society year in 1972. The following were elected:

Honorary Chairman, Max Hecht, also to

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be a permanent member of the Executive Subcommittee D-19.1

Chairman, J. K. Rice

1st Vice-Chairman, F. E. Clarke

2nd Vice-Chairman, R. A. Baker

NOTE—To secure continuity of operation, the Board of Directors is permitting the two vice-chairmen to serve an additional term.

Secretary, W. L. Nieland

Membership Secretary, O. M. Elliott

Revisions of the bylaws of Committee D-19 will be letter balloted, establishing the office of Membership Secretary.

RECOMMENDATIONS ACCEPTED BY THE COMMITTEE ON STANDARDS

Subsequent to the 1969 annual report, Committee D-19 presented to the Society through the Committee on Standards the following recommendations, which were accepted effective on the dates indicated:

New Tentatives:

D 2907 - 70 T, Methods of Test for Microquantities of Water (Subcommittee D-19.6) (effective Oct. 2, 1970)

The method covers the determination, by measurement of fluorescence, of microquantities of uranium in water in the concentration range of 0.005 to 50 mg/liter.

D 2908 - 70 T, Recommended Practice for Measuring Volatile Organic Matter in Water by Aqueous-Injection Gas Chromatography (Subcommittee D-19.6) (effective Oct. 2, 1970)

The recommended practice covers both qualitative and quantitative determinations of volatile organic matter in water by gas chromatography. Identification of such constituents is needed for support of programs concerned with in plant water quality, as well as for pollution control.

D 2909 - 70 T, Method for the Removal of Organic Matter from Water by Activated Charcoal Adsorption (Subcommittee D-19.6) (effective Oct. 2, 1970)

This method provides a technique for removal of organic matter from water for analytical purposes, by means of adsorbing the organic matter onto activated charcoal. By means of this method, organic con-

stituents can be separate and concentrated for subsequent analysis.

D 2910 - 70 T, Methods of Test for Cyclohexylamine in Water (Subcommittee D-19.1) (effective Oct. 2, 1970)

This method covers a colorimetric procedure for the determination of cyclohexylamine in boiler feedwater and steam condensate.

Revision of Tentatives:

D 2777 - 70 T (formerly D 2777 - 69 T), Recommended Practice for Determination of Precision of Methods of Committee D-19 on Water (Subcommittee D-19.1) (effective Oct. 2, 1970)

The revision of this practice reduces, from four to three, the number of levels of concentration at which tests should be conducted to determine precision of a given method of analysis where pilot work suggests that precision is linear with level of concentration.

D 2790 - 70 T (formerly D 2790 - 69 T), Methods of Analysis of Solvent Systems Used for Removal of Water-Formed Deposits (Subcommittee D-19.7) (effective Oct. 2, 1970)

The revision of this method incorporates the results of added experience with the method, the greatest change being in the revision of the formulas for a number of the calculations of results of tests.

Withdrawal of Tentatives:

D 1944 - 66 T, Method of Test for Radioactive Strontium in Industrial Water and Industrial Waste Water (Subcommittee D-19.4) (effective Oct. 2, 1970)

D 2335 - 65 T, Method of Test for Radium-226 in Industrial Water and Industrial Waste Water (Subcommittee D-19.4) (effective Oct. 2, 1970)

The new and revised tentatives appear in the 1970 *Annual Book of ASTM Standards*, Part 23.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee D-19 submitted the following

REPORT OF COMMITTEE D-19

recommendations to the Society for action under the Interim Procedure for Standards, which were accepted by the Society effective on the dates indicated:

Adoption of Tentatives as Standard Without Revision:

- D 2470 - 70** (formerly D 2470 - 66 T), Method for Measurement of Delayed Neutron-Emitting Fission Products in Nuclear Reactor Coolant Water During Reactor Operation (Subcommittee D-19.4) (effective Oct. 2, 1970)
- D 2778 - 70** (formerly D 2778 - 69 T), Method of Test for Solvent Extraction of Organic Matter from Water (Subcommittee D-19.6) (effective Oct. 2, 1970)

Adoption of Tentatives as Standard with Revision:

- D 2460 - 70** (formerly D 2460 - 66 T), Method of Test for Radionuclides of Radium in Water (Subcommittee D-19.4) (effective Oct. 2, 1970)

A revision was made in the title of this method, along with general editorial changes, and a change in the Precision.

- D 2576 - 70** (formerly D 2576 - 67 T), Methods of Test for Metals in Industrial Water and Industrial Waste Water by Atomic Absorption Spectrophotometry (Subcommittee D-19.5) (effective Sept. 11, 1970)

This method has been revised to include the determination of nine additional metals.

Adoption of Tentative Revision as Standard:

- D 2688 - 70** (formerly D 2688 - 69), Methods of Test for Corrosivity of Water in the Absence of Heat Transfer (Weight Loss Methods) (Subcommittee D-19.3) (effective Oct. 2, 1970)

Tentative Method C adopted for inclusion in the methods.

Revision of Standards, Immediate Adoption:

- D 1067 - 70** (formerly D 1067 - 68), Methods of Test for Acidity or Alkalinity of Water (Subcommittee D-19.5) (effective Oct. 2, 1970)

This method was revised for a change in

title, and the addition of Method E, Color-Change Titration After Hydrogen Peroxide Oxidation and Boiling.

- D 1192 - 70** (formerly D 1192 - 64), Specifications for Equipment for Sampling Industrial Water and Steam (Subcommittee D-19.3) (effective Oct. 2, 1970)

Extensive revisions have been made throughout this method.

- D 1193 - 70** (formerly D 1193 - 66), Specifications for Reagent Water (Subcommittee D-19.2) (effective Oct. 2, 1970)

This method was revised to change "referee" and "nonreferee" reagent waters to Type I and Type II, respectively.

- D 1783 - 70** (formerly D 1783 - 62), Methods of Test for Phenolic Compounds in Water (Subcommittee D-19.6) (effective Oct. 2, 1970)

Extensive revisions have been made throughout this method.

- D 2476 - 70** (formerly D 2476 - 69), Methods of Test for Radioactive Tritium in Water (Subcommittee D-19.4) (effective Oct. 2, 1970)

This method was revised to include a change in the Scope and Procedure.

Withdrawal of Standards:

- D 1178 - 60 (1967)**, Method of Test for Chloroform-Extractable Matter in Industrial Water and Industrial Waste Water (Subcommittee D-19.6) (effective Oct. 2, 1970)
- D 1340 - 60 (1967)**, Method of Test for Oily Matter in Industrial Waste Water (Subcommittee D-19.6) (effective Oct. 2, 1970)
- D 1891 - 69**, Method of Test for Hexane-Extractable Matter in Water (Subcommittee D-19.6) (effective Oct. 2, 1970)
- D 2329 - 68**, Method of Test for Biochemical Oxygen Demand of Industrial Water and Industrial Waste Water (Subcommittee D-19.6) (effective Oct. 2, 1970)

Reapproval of Standards:

- D 807 - 52 (1970)**, Method of Corrosivity Test in Industrial Water (USBM Embrittlement Detector Method)

REPORT OF COMMITTEE D-19

- D 887 - 49 (1970)**, Method of Field Sampling of Water-Formed Deposits
D 932 - 58 (1970), Method of Test for Iron Bacteria in Industrial Water and Water-Formed Deposits
D 934 - 52 (1970), Method of Identification of Crystalline Compounds in Water-Formed Deposits by X-Ray Diffraction
D 993 - 58 (1970), Methods of Test for Sulfate-Reducing Bacteria in Industrial Water and Water-Formed Deposits
D 1245 - 55 (1970), Method of Examination of Water-Formed Deposits by Chemical Microscopy
D 1291 - 57 (1970), Method of Test for Chlorine Requirement of Industrial Water and Industrial Waste Water
D 1292 - 65 (1970), Method of Test for

Odor in Industrial Water and Industrial Waste Water

- D 1293 - 65 (1970)**, Method of Test for pH of Industrial Water and Industrial Waste Water

- D 1345 - 59 (1970)**, Method of Test for Evaluating Acute Toxicity of Industrial Waste Water to Fresh-Water Fishes

- D 1498 - 59 (1970)**, Method of Test for Oxidation-Reduction Potential of Industrial Water

Respectfully submitted on behalf of the committee,

MAX HECHT,
Chairman

W. L. NIELAND,
Secretary

REPORT OF COMMITTEE D-20 ON PLASTICS

Committee D-20 on Plastics has held three meetings during the year: Atlantic City, N. J., June 23 to 26, 1969, at the Annual Meeting of the Society; Detroit, Mich., Oct. 27 to 30, 1969; and Cincinnati, Ohio, March 3 to 6, 1970.

The fall meeting included a technical seminar on High Speed Puncture Testing and Tests for Atmospheric Phenomena.

The committee consists of 519 individuals, of whom 325 are voting members; 160 of the voting members are classified as producers, 80 as consumers, and 85 as general interest members.

RECOMMENDATIONS ACCEPTED BY THE COMMITTEE ON STANDARDS

Subsequent to the 1969 annual report, Committee D-20 presented to the Society through the Committee on Standards the following recommendations, which were effective on the dates indicated:

New Tentatives:

D 2836 - 69 T, Specification for Filled Poly(Vinyl Chloride) (PVC) Sewer Pipe (Subcommittee D-20.17) (effective Nov. 7, 1969)

This tentative covers new specifications for a non-filled PVC sewer pipe.

D 2846 - 69 T, Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Hot Water Distribution Systems (Subcommittee D-20.17) (effective Nov. 7, 1969)

This tentative covers specifications needed for code authorities and purchasers.

D 2852 - 69 T, Styrene-Rubber Plastic Drain and Building Sewer Pipe and Fittings (Subcommittee D-20.17) (effective Dec. 19, 1969)

A specification was needed for this type of sewer pipe, which is currently being produced and used.

D 2897 - 70 T, Specification for Reinforced and Filled Nylon Injection Molding and Extrusion Materials (Subcommittee D-20.80) (effective June 12, 1970)

This specification covers reinforced and filled nylon materials suitable for injection molding or extrusion, or both. These consist of nylon materials to which have been added other materials to serve as reinforcements or fillers from the group: glass (fibers, beads, or other structural form), molybdenum disulfide, TFE-fluorocarbon resin, asbestos, and graphite.

Revision of Tentative Specification for:

D 2680 - 69 T (formerly D 2680 - 68 T), Acrylonitrile-Butadiene-Styrene (ABS) Composite Pipe (Subcommittee D-20.17) (effective Nov. 7, 1969)

This tentative was revised to conform with industry practice.

Withdrawal of Tentative:

D 2127 - 62 T, Test for Water Absorption of Rigid Cellular Plastics (Subcommittee D-20.22) (effective Nov. 14, 1969)

This tentative is replaced by Method D 2842.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee D-20 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which were accepted by the Society effective on the dates indicated:

REPORT OF COMMITTEE D-20

New Standards:

- D 2837 - 69**, Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials (Subcommittee D-20.17) (effective Nov. 14, 1969)

This method describes a procedure for obtaining a hydrostatic design basis for thermoplastic pipe. The method is applicable to all known types of thermoplastic pipe and for any practical temperature and medium.

- D 2838 - 69**, Method of Test for Shrink Tension and Orientation Release Stress of Plastic Film and Thin Sheet (Subcommittee D-20.19) (effective Nov. 14, 1969)

This method provides sensitive procedures for determining the shrink tension and related characteristics, that is shrink force and orientation release stress of heat shrinkable plastic film and sheeting less than 0.8 mm (0.03 in.) in thickness. Two procedures are described that permit the measurement of shrink forces at predetermined temperatures.

- D 2839 - 69**, Recommended Practice for the Use of a Melt Index Strand for Determining Density of Polyethylene (Subcommittee D-20.12) (effective Dec. 18, 1969)

This recommended practice covers the preparation of sample for polyethylene density determination by Method D 1505 using a strand produced by extrusion of the polyethylene by Method D 1238, Condition E (Melt Index).

- D 2840 - 69**, Method of Test for Average True Particle Density of Hollow Microspheres (Subcommittee D-20.60) (effective Nov. 14, 1969)

This method describes the procedure for determining the average true particle density of hollow microspheres of the type used in syntactic foam buoyancy materials.

- D 2841 - 69**, Method of Sampling Hollow Microspheres (Subcommittee D-20.60) (effective Nov. 14, 1969)

This method describes the procedure of sampling prior to running other tests.

- D 2842 - 69**, Method of Test for Water Absorption of Rigid Cellular Plastics (Sub-

committee D-20.22) (effective Nov. 14, 1969)

This method describes a procedure for determining the water absorption of rigid cellular plastics by measuring the change in buoyant force resulting from immersion under a 2-in. head of water for 96 hr.

- D 2843 - 70**, Method for Measuring the Density of Smoke from the Burning or Decomposition of Plastics (Subcommittee D-20.30) (effective Jan. 30, 1970)

This method covers a laboratory procedure for measuring and observing the relative amounts of smoke produced by the burning or decomposition of plastics. It is intended to be used for measuring the smoke-producing characteristics of plastics under controlled conditions of combustion or decomposition. Correlation with other fire conditions is not necessarily implied. The measurements are made in terms of the loss of light transmission through a collected volume of smoke produced under controlled, standardized conditions. The apparatus is constructed so that the flame and smoke can be observed during the test.

- D 2848 - 69**, Specification for Reinforced Polycarbonate Injection Molding and Extrusion Materials (Subcommittee D-20.15) (effective Dec. 19, 1969)

This specification covers polycarbonate materials suitable for injection molding or extrusion, or both, that contain reinforcements and other additives.

- D 2849 - 69**, Methods of Testing Urethane Foam Polyol Raw Materials (Subcommittee D-20.22) (effective Dec. 19, 1969)

These methods cover procedures for testing polyol raw materials used in preparing urethane foams, including both polyesters and polyethers.

- D 2853 - 70**, Specification for Reinforced Olefin Polymers for Injection Molding or Extrusion (Subcommittee D-20.80) (effective March 6, 1970)

This specification covers reinforced olefin polymers suitable for injection molding or extrusion. Polymers consist of propylene ho-

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mopolymers, ethylene homopolymers, or copolymers of them, to which have been added various other materials or combinations of materials to serve as reinforcements from the group including glass fibers, talc, and asbestos.

D 2855 - 70, Recommended Practice for Making Solvent Cemented Joints with Poly(Vinyl Chloride) (PVC) Plastic Pipe and Fittings (Subcommittee D-20.17) (effective Feb. 27, 1970)

A procedure is described for making joints with poly(vinyl chloride) (PVC) plastic pipes, both plain ends and fittings, and bell ends, by means of solvent cements, sometimes called solvent welding.

D 2856 - 70, Method of Test for Open Cell Content of Rigid Cellular Plastics by the Air Pycnometer (Subcommittee D-20.22) (effective Feb. 27, 1970)

Cellular plastics are composed of thin membranes of walls of polymer, separating small cavities or cells. The cells may be largely interconnecting (open cell), largely nonconnecting (closed cell), or any combination. It is the purpose of this method to determine numerical values for the percentage of volume occupied by open cells. The percentage of volume occupied by closed cells will also include cell walls.

D 2857 - 70, Method of Test for Dilute-Solution Viscosity of Polymers (Subcommittee D-20.70) (effective April 17, 1970)

This method covers determination of the dilute-solution viscosity of polymers. It is applicable to all polymers that dissolve completely without chemical reaction or degradation to form solutions that are stable with time at a temperature between ambient and approximately 150 C.

D 2863 - 70, Method of Test for Flammability of Plastics Using the Oxygen Index Method (Subcommittee D-20.30) (effective May 8, 1970)

This method describes a procedure for determining the relative flammability of plastics by measuring the minimum concentration of oxygen in a slowly rising mixture of oxygen.

D 2873 - 70, Method for Definition of Interior Porosity of PVC Resins by Mercury Intrusion Porosimetry (Subcommittee D-20.15) (effective June 12, 1970)

This method describes a procedure for measuring the interior pore volume and the apparent pore diameter distribution of porous PVC resins.

D 2874 - 70, Specification for Polyphenylene Oxide Molding and Extrusion Materials (Subcommittee D-20.15) (effective June 12, 1970)

This specification covers polyphenylene oxide plastic molding and extrusion materials consisting of a major portion of polyphenylene oxide resins made from 2,6-xylenol and containing additives, colorants, and fillers.

Adoption of Tentatives as Standard without Revision:

D 695 - 69 (formerly D 695 - 68 T), Method of Test for Compressive Properties of Rigid Plastics (Subcommittee D-20.10) (effective Dec. 19, 1969).

D 746 - 70 (formerly D 746 - 64 T), Method of Test for Brittleness Temperature of Plastics and Elastomers by Impact (Subcommittee D-20.30) (effective May 29, 1970)

D 1746 - 70 (formerly D 1746 - 62 T), Method of Test for Transparency of Plastic Sheeting (Subcommittee D-20.40) (effective Jan. 22, 1970)

D 1925 - 70 (formerly D 1925 - 63 T), Method of Test for Yellowness Index of Plastics (Subcommittee D-20.40) (effective Jan. 22, 1970)

D 2236 - 69 (formerly D 2236 - 67 T), Method of Test for Dynamic Mechanical Properties of Plastics by Means of a Torsional Pendulum (Subcommittee D-20.10) (effective Dec. 19, 1969)

D 2411 - 69 (formerly D 2411 - 65 T), Specification for Cellulose Acetate Butyrate Film and Sheeting for Fabricating and Forming (Subcommittee D-20.19) (effective Dec. 19, 1969)

D 2445 - 69 (formerly D 2445 - 65 T), Method of Test for Thermal Oxidative Stability of Propylene Plastics (Subcommittee D-20.12) (effective Dec. 19, 1969)

D 2530 - 69 (formerly D 2530 - 66 T), Spec-

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ification for Nonoriented Propylene Plastic Film (Subcommittee D-20.19) (effective Dec. 19, 1969)

D 2552 - 69 (formerly D 2552 - 66 T), Method of Test for Environmental Stress Rupture of Type III Polyethylenes Under Constant Tensile Load (Subcommittee D-20.12) (effective Dec. 19, 1969)

D 2562 - 70 (formerly D 2562 - 66 T), Recommended Practice for Classifying Visual Defects in Compression and Transfer Molded Parts (Subcommittee D-20.18) (effective Jan. 22, 1970)

D 2563 - 70 (formerly D 2563 - 66 T), Recommended Practice for Classifying Visual Defects in Glass-Reinforced Laminates and Parts Made Therefrom (Subcommittee D-20.18) (effective Jan. 22, 1970)

D 2660 - 70 (formerly D 2660 - 67 T), Specification for Woven Glass Fabric, Cleaned and After-Finished with Acrylic-Silane Type Finishes for Plastic Laminates (Subcommittee D-20.18) (effective Jan. 22, 1970)

Adoption of Tentatives as Standard with Revision:

D 1238 - 70 (formerly D 1238 - 65 T), Measuring Flow Rates of Thermoplastics by Extrusion Plastometer (Subcommittee D-20.30) (effective June 12, 1970)

This revision improves continuity and clarity.

D 1636 - 70 (formerly D 1636 - 65 T), Specification for Allyl Molding Compounds (Subcommittee D-20.15) (effective Feb. 27, 1970)

This revision added a high-impact glass-filled diallyl phthalate molding compound (minimum 6.0 ft·lb/in. of notch) to be designated Type I, Grade 4. As results of round-robin testing of three of the above-mentioned molding compounds, all values exceed 6.0 ft·lb.

D 1638 - 70 (formerly D 1638 - 67 T), Method of Testing Urethane Foam Isocyanate Raw Materials (Subcommittee D-20.16) (effective Jan. 22, 1970)

This revision updated the test method to conform with changes in the urethane foam industry.

D 2143 - 69 (formerly D 2143 - 63 T), Method of Test for Cyclic Pressure Strength of Reinforced, Thermosetting Plastic Pipe (Subcommittee D-20.17) (effective Nov. 14, 1969)

This method was revised to standardize hoop stress and set cyclic rates to improve the method of test.

D 2288 - 69 (formerly D 2288 - 64 T), Method of Test for Weight Loss of Plasticizers on Heating (Subcommittee D-20.15) (effective Nov. 14, 1969)

This method was revised to bring it into conformity with industry practice.

D 2290 - 69 (formerly D 2290 - 64 T), Method of Test for Apparent Tensile Strength of Ring or Tubular Plastics by Split Disk (Subcommittee D-20.10) (effective Nov. 14, 1969)

This revision is intended to permit the use of extruded or molded specimens as well as parallel reinforced filament wound specimens. The method has been demonstrated to be particularly valuable in assessing the tensile properties of thermoplastic pipe as well as for the parallel fiber-reinforced specimens for which it was originally developed. This revision provides for the use of specimens having a reduced cross section for extruded or molded homogeneous materials; for reinforced specimens the reinforcement must be essentially parallel in order to give meaningful results.

D 2647 - 70 (formerly D 2647 - 67 T), Specification for Crosslinkable Ethylene Plastics (Subcommittee D-20.12) (effective June 12, 1970)

The range of cell values for commercial materials was revised.

D 2326 - 70 (formerly D 2326 - 64 T), Method of Test for Thermal Conductivity of Cellular Plastics by Means of a Probe (Subcommittee D-20.22) (effective Jan. 22, 1970)

This method was changed to conform with current practice.

D 2680 - 70 (formerly D 2680 - 69 T), Specification for Acrylonitrile-Butadiene-Sty-

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rene (ABS) Composite Pipe (Subcommittee D-20.17) (effective May 8, 1970)

This specification was revised to conform with industry practice.

Revision of Standards:

D 696 - 70 (formerly D 696 - 44 (1961), Method of Test for Coefficient of Linear Thermal Expansion of Plastics (Subcommittee D-20.70) (effective Feb. 27, 1970)

This method was revised to bring it more into line with practice and to achieve reconciliation.

D 707 - 70 (formerly D 707 - 63), Specification for Cellulose Acetate Butyrate Molding and Extrusion Compounds (Subcommittee D-20.15) (effective Jan. 22, 1970)

Revision brought this method into current format.

D 707 - 70a (formerly D 707 - 70), Specification for Cellulose Acetate Butyrate Molding and Extrusion Compounds (Subcommittee D-20.15) (effective June 12, 1970)

This specification was revised to bring it into current format and to cause it to conform with physical requirements for weather resistance.

D 787 - 70 (formerly D 787 - 63), Specification for Ethyl Cellulose Molding and Extrusion Compounds (Subcommittee D-20.15) (effective Jan. 22, 1970)

This specification was revised to bring it into current format.

D 790 - 70 (formerly D 790 - 66), Method of Test for Flexural Properties of Plastics (Subcommittee D-20.10) (effective July 15, 1970)

This method was revised to add a four-point loading system.

D 883 - 69a (formerly D 883 - 69), Nomenclature Relating to Plastics (Subcommittee D-20.92) (effective Dec. 19, 1969)

Definitions were updated to conform with current usage.

D 1248 - 70 (formerly D 1248 - 69), Specification for Polyethylene Plastics Molding and Extrusion Materials (Subcommittee D-20.12) (effective June 12, 1970)

This revision added a requirement for environmental stress cracking resistance for Grade P 34.

D 1435 - 69 (formerly D 1435 - 65), Recommended Practice for Outdoor Weathering of Plastics (Subcommittee D-20.50) (effective Nov. 14, 1969)

An appendix was added listing suggested test methods for evaluating changes in properties during exposure to outdoor weathering. Included are groupings of test methods for appearance properties, electrical properties, and mechanical properties. Other minor changes have been introduced to provide clarification or to call attention to points of importance.

D 1527 - 69 (formerly D 1527 - 68), Specification for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe, Schedules 40 and 80 (Subcommittee D-20.17) (effective Dec. 12, 1969)

Sections 5.5 and 6.7 were deleted. The Acetic Acid Immersion Test, D 1939, has been found unsuitable for quality testing of ABS Pipe.

D 1562 - 70 (formerly D 1562 - 60), Specification for Cellulose Propionate Molding and Extrusion Compounds (Subcommittee D-20.15) (effective Jan. 22, 1970)

This specification was revised to bring it into current format.

D 1562 - 70a (formerly D 1562 - 70), Specification for Cellulose Propionate Molding and Extrusion Compounds (Subcommittee D-20.15) (effective June 12, 1970)

This specification was revised to bring it into current format and to cause it to conform with physical requirements for weather resistance.

D 1693 - 70 (formerly D 1693 - 66), Method of Test for Environmental Stress-Cracking of Type I Ethylene Plastics (Subcommittee D-20.12) (effective Jan. 22, 1970)

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This method was changed to reflect current industry practice and to make the method applicable for testing Types II, III, and IV polyethylene plastics.

D 1784 - 69 (formerly D 1784 - 68), Specification for Rigid Poly(Vinyl Chloride) Compounds and Chlorinated Poly(Vinyl Chloride) Compounds (Subcommittee D-20.15) (effective Dec. 19, 1969)

This specification was revised to bring the specification into conformity with industry practice. This revised Specification D 1784 will replace Specification D 2114, for Rigid Poly(Vinyl Chloride-Vinyl Acetate) Compounds.

D 1895 - 69 (formerly D 1895 - 67), Method of Test for Apparent Density, Bulk Factor, and Pourability of Plastic Materials (Subcommittee D-20.70) (effective Nov. 14, 1969)

This method was revised to add two notes of caution from experience with the method.

D 2122 - 70 (formerly D 2122 - 67), Method of Determining Dimensions of Thermoplastic Pipe (Subcommittee D-20.17) (effective Feb. 27, 1970)

This method was revised to include measurements of fittings and to clarify other sections.

D 2124 - 70 (formerly D 2124 - 67), Method for Infrared Spectrophotometric Analysis of Components in Poly(vinyl chloride) Compounds (Subcommittee D-20.70) (effective April 13, 1970)

This method was revised to indicate limitations with respect to polymeric plasticizers and other new items outside its scope.

D 2146 - 69 (formerly D 2146 - 68), Specification for Propylene Plastic Molding and Extrusion Materials (Subcommittee D-20.12) (effective Nov. 14, 1969)

This method was revised to conform to normal practice in industry.

D 2236 - 70 (formerly D 2236 - 69), Method of Test for Dynamic Mechanical Properties of Plastics by Means of a Tor-

sional Pendulum (Subcommittee D-20.10) (effective June 12, 1970)

This revision improves the clarity of the method.

D 2239 - 69 (formerly D 2239 - 68), Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) (Subcommittee D-20.17) (effective Nov. 14, 1969)

This revision added a new commercial size and reduced wide spread in the burst test.

D 2241 - 69 (formerly D 2241 - 68), Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe (SDR-PR and Class T) (Subcommittee D-20.17) (effective Nov. 14, 1969)

Pipes with the deleted wall thicknesses are no longer commercially available.

D 2282 - 69 (formerly D 2282 - 68), Specification for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe (SDR-PR and Class T) (Subcommittee D-20.17) (effective Nov. 14, 1969)

Section 6(g) was deleted because the Acetic Acid Immersion Test, D 1939, has been found unsuitable for quality testing of ABS Pipe.

D 2282 - 69a (formerly D 2282 - 69), Specification for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe (SDR-PR and Class T) (Subcommittee D-20.17) (effective Dec. 12, 1969)

Pipes with the deleted wall thicknesses are no longer commercially available.

D 2444 - 70 (formerly D 2444 - 67), Method of Test for Impact Resistance of Thermoplastic Pipe and Fittings by Means of a Tup (Falling Weight) (Subcommittee D-20.17) (effective May 8, 1970)

This revision brings the method into current format.

D 2464 - 69 (formerly D 2464 - 68), Specification for Threaded Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80 (Subcommittee D-20.17) (effective Nov. 14, 1969)

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D 2465 - 69 (formerly D 2465 - 68), Specification for Threaded Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe Fittings, Schedule 80 (Subcommittee D-20.17) (effective Nov. 14, 1969)

D 2466 - 69 (formerly D 2466 - 68), Specification for Socket-Type Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40 (Subcommittee D-20.17) (effective Nov. 14, 1969)

D 2467 - 69 (formerly D 2467 - 68), Specification for Socket-Type Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80 (Subcommittee D-20.17) (effective Nov. 14, 1969)

D 2468 - 69 (formerly D 2468 - 68), Specification for Socket-Type Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe Fittings, Schedule 40 (Subcommittee D-20.17) (effective Nov. 14, 1969)

D 2469 - 69 (formerly D 2469 - 68), Specification for Socket-Type Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe Fittings, Schedule 80 (Subcommittee D-20.17) (effective Nov. 14, 1969)

Specifications D 2464 through D 2469 were revised to include new grades and to change table of values.

D 2473 - 70 (formerly D 2473 - 66), Specification for Polycarbonate Plastic Molding, Extrusion, and Casting Materials (Subcommittee D-20.15) (effective June 12, 1970)

This specification was upgraded to conform with current practice.

D 2566 - 69 (formerly D 2566 - 68), Method of Test for Linear Shrinkage of Thermosetting Casting Systems During Cure (Subcommittee D-20.16) (effective Nov. 14, 1969)

This revision added a smaller mold size.

D 2568 - 70 (formerly D 2568 - 68), Recommended Practice for Calculation of Absorbed Dose from Gamma Radiation (Subcommittee D-20.20) (effective Feb. 27, 1970)

This revision standardizes calculation procedures.

D 2581 - 69 (formerly D 2581 - 67), Specification for Polybutylene Plastics (Subcommittee D-20.12) (effective Nov. 14, 1969)
This specification was revised to conform to industry practice.

D 2750 - 69 (formerly D 2750 - 68), Specification for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Utilities Conduit and Fittings (Subcommittee D-20.17) (effective Dec. 12, 1969)

Section 4.4 was deleted because the Acetic Acid Immersion Test, D 1939, has been found unsuitable for quality testing of ABS Pipe.

D 2750 - 70 (formerly D 2750 - 69), Specification for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Utilities Conduit and Fittings (Subcommittee D-20.17) (effective Jan. 22, 1970)

This revision deleted the words "and fillers" and added "and" before "stabilizers."

D 2751 - 69 (formerly D 2751 - 68), Specification for Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe and Fittings (Subcommittee D-20.17) (effective Dec. 12, 1969)

Section 5.9 was deleted because the Acetic Acid Immersion Test, D 1939, has been found unsuitable for quality testing of ABS Pipe.

Withdrawal of Standard:

D 2114 - 66, Specification for Rigid Poly(Vinyl Chloride-Vinyl Acetate) Compounds (Subcommittee D-20.15)

This standard was replaced by Specification D 1784.

Reapprovals of Standards:

D 673 - 44 (1969), Test for Mar Resistance of Plastics

D 674 - 56 (1969), Recommended Practices for Testing Long-Time Creep and Stress-Relaxation of Plastics Under Tension or Compression Loads at Various Temperatures

D 704 - 62 (1969), Specification for Melamine-Formaldehyde Molding Compounds

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- D 705 - 62 (1969)**, Specification for Urea-Formaldehyde Molding Compounds
- D 732 - 46 (1969)**, Test for Shear Strength of Plastics
- D 952 - 51 (1969)**, Test for Bond Strength of Plastics and Electrical Insulating Materials
- D 953 - 54 (1969)**, Test for Bearing Strength of Plastics
- D 955 - 51 (1969)**, Measuring Shrinkage from Mold Dimensions of Molded Plastics
- D 956 - 51 (1969)**, Recommended Practice for Molding Specimens of Amino Plastics
- D 957 - 50 (1969)**, Recommended Practice for Determining Mold Surface Temperature of Commercial Molds for Plastics
- D 958 - 51 (1969)**, Recommended Practice for Determining Temperatures of Standard ASTM Molds for Test Specimens of Plastics
- D 1044 - 56 (1969)**, Test for Resistance of Transparent Plastics to Surface Abrasion
- D 1130 - 63 (1969)**, Recommended Practice for Injection Molding of Specimens of Thermoplastic Materials
- D 1201 - 62 (1969)**, Specification for Polyester Molding Compounds
- D 1242 - 56 (1969)**, Tests for Resistance to Abrasion of Plastic Materials
- D 1494 - 60 (1969)**, Test for Diffuse Light Transmission Factor of Reinforced Plastics Panels
- D 1502 - 60 (1969)**, Test for Transverse Load of Corrugated Reinforced Plastic Panels
- D 1547 - 61 (1969)**, Specification for Extruded Acrylic Plastic Sheet
- D 1593 - 61 (1969)**, Specification for Non-rigid Vinyl Chloride Plastic Sheeting
- D 1602 - 60 (1969)**, Test for Bearing Load of Corrugated Plastics Panels
- D 1604 - 63 (1969)**, Measuring Flatness of Plastic Sheet or Tubing
- D 1622 - 63 (1970)**, Test for Apparent Density of Rigid Cellular Plastics

ACTIVITIES OF SUBCOMMITTEES

Subcommittee D-20.10 on Mechanical Properties (K. B. Goldblum, chairman)—Section 01 on Tensile Properties is preparing an appendix to D 638 to act as a guide to industry-used crosshead rates in tensile testing for those materials which do not have a tensile test in their specification. Work on

Poisson's ratio of plastics is being done under Prof. A. L. Tilmans, University of Pittsburgh. The Type L specimen of D 1822 has been added to the specimens in D 638. The "bow tie" specimen recommended by MIL Handbook 17 is being investigated. Section 02 on Impact Strength is looking into the notch sensitivity of plastics and also into the use of the "reverse" notch specimen for reinforced thermoplastics. Work has been going on in the sheet impact area. A section ballot will be issued before the Toronto meeting. Liaison with Subcommittee 19 has resulted in a simultaneous letter ballot on a pneumatic ball type film impact test to be sent out to Subcommittee 19 and Section 02. Section 03 on Fatigue Properties has been revising D 671. The revision has passed a section letter ballot and is going out to a Subcommittee 10 ballot shortly. Progress is reported from Section 05 on Specimen Gripping. Round robin work is essentially complete on film gripping. The round robin on gripping of molded parts has been completed and appropriate wording to be included in the associated methods will be presented at Toronto. Section 06 on Flexural Properties has had an active task group working on the calibration of the equipment in D 1043. These procedures are ready for a Section letter ballot before the Toronto meeting. D 790 was revised editorially for clarity and order of related subjects. A revision of D 790 to suggest that corrections may be necessary when the deflection exceeds 10 percent of the span is being balloted in the section. Section 08 on High Speed Properties has been conducting a round robin using the "racetrack" specimen. This work is about finished and will be acted on at Toronto. A study is in progress on high speed puncture and the data will be reported shortly. Section 14 on Creep Properties has been reactivated and is off to a good start toward the revision and updating of D 674. Section 15 on Dynamic Properties is completing a round robin on instrumented torsional pendulum equipment. The results will be reported at the fall meeting. Section 18 on Surface Properties is in the process of conducting a simultaneous letter ballot of D-20 and Subcommittee 10 on a proposed method for determining the kinetic coefficient of friction by a variable speed frictionometer. This sec-

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tion is also surveying methods of determining static coefficient of friction. Work on film and sheeting friction determination using a three point sled is in progress. During this year a methods review task group was established under the leadership of G. D. Patterson, Jr. It is the aim of this task group to review the methods under Subcommittee 10 jurisdiction with the idea of eventual reaffirmation, suggestion for revision, combination with some other method, or deletion from the books. To date, this task group has been of great assistance.

Subcommittee D-20.12 on Olefin Plastics (K. A. Kaufmann, chairman) developed an alternative method for determining the density of polyethylene. Revisions were made to the specification for crosslinkable polyolefin plastics, the specification for polyethylene, and the polyethylene environmental stress cracking method. Work continued on the preparation of a cell type specification for all types of polyethylene. Development continued on the oxidative and processing stabilities of polypropylene, the thermal stress cracking of polyethylene, the sample preparation of crosslinkable polyolefin plastics and the preparation of compression molded polyethylene sheets and test specimens.

Subcommittee D-20.13 on Statistical Techniques (Miss Mary T. Dunleavy, chairman) is revising Method D 1898 for Sampling of Plastics. The subcommittee helped other subcommittees set up some round robins and analyze data obtained in earlier round robins. In particular they set up one to be run in a single laboratory using a new method for measuring thermoset flow of thermoplastics. Committee E-11 hopes to use the results from this round robin in a document on studying a new test method in the method-organizing laboratory.

Subcommittee D-20.15 on Thermoplastics Materials (R. W. Kuchkuda, chairman) revised and updated materials specifications and continued its work in the area of new materials specifications and the special test methods needed for them. A new specification for "Dimensions and Tolerances for Plastic Bottles" was sent for Society ballot. Work currently under way in the various sections includes: Method for Flow Characterization of Poly(Vinyl Chloride) Plastics,

Investigation of Bottle Impact Test Methods, Standard (NBS) Polyvinyl Chloride Polymers, Plasticizer Analysis by Gas Chromatography, Halocarbon Test Specimen Preparation, Annealing ABS Specimens for Stress Relief. The section on thermoplastics for plating has been put on inactive status because of a transfer of interest and work to Subcommittee B-8 on Plating.

Subcommittee D-20.16 on Thermosetting Materials (H. L. Thomas, chairman) is investigating impact resistance and flame-retardant properties on allyl molding compounds and methods of testing for hydrolyzable chlorine in epoxy materials. A new specification for epoxy molding compounds has reached committee ballot. Revision to D 2471 on Gel Time and Peak Exothermic Temperature of Reacting Thermosetting Plastic Compositions is under consideration.

Joint ASTM-PPI Subcommittee D-20.17 on Thermoplastic Pipe and Fittings (K. C. Ford, chairman) has continued to increase its membership and now has over 150 voting members. Work on new specifications, test methods, and recommended practices for thermoplastic pipe, fittings, and solvent cements continues, together with many revisions to published standards to keep them current.

Subcommittee D-20.18 on Thermosetting Reinforced Plastics (J. F. Corey, chairman) continued its decline which started in 1969. D-20.18 has no active section, and is reduced to carrying on its activities through the subcommittee meeting only. While the roll of "active" D-20.18 members includes some 85 people, the average attendance at the last three meetings was eight. Anticipated specifications for Roving- and Mat-type reinforcements did not materialize in the year just past. Productive activity in D-20.18 during the past year included editorial revision to include incorporate metric units in three standards, proposals for adoption as standard of nine tentatives, and new proposed standards.

Subcommittee D-20.19 on Sheeting (D. C. Crawford, chairman) prepared methods for measuring film stiffness and film shrink. Work continued in areas of gel count methods, film blocking tests, and film impact tests.

Subcommittee D-20.20 on The Effects of Nuclear and High Energy Radiation (Oscar

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Sisman, chairman) has drafted a classification system for polymeric materials for service in ionizing radiation. This document will be prepared for letter ballot during the coming year. Three new methods for gamma dosimetry are nearly ready for subcommittee letter ballot: a ferrous copper sulfate method, a ceric sulfate method, and one employing Perspex plastic. A glass dosimetry method and a method using radiochromic dye systems are being readied for round-robin testing. Section 05 is studying methods for monitoring gamma radiation in the presence of neutrons.

Subcommittee D-20.22 on Cellular Plastics (W. A. Ashe, chairman) has completed the revision and up-dating of most of the methods and specifications under its jurisdiction. In 1969 the subcommittee worked actively on the revision of D 2126, Resistance of Rigid Cellular Plastics to Simulated Service Conditions. The scope and range of temperatures are being expanded so better characterization of foam is possible. A task group has been formed with C-16 for the revision of C 356, C 411 and C 447 and incorporating the tentative draft for high temperature performance of rigid cellular plastics into one single all-encompassing method. The subcommittee has reviewed the ISO methods and is studying new ASTM working drafts for the following properties: shear strength, flex strength, heat creep test, friability, standard sample size, measurement criteria, MVT, and heat distortion. These new D-20.22 methods are specifically for cellular plastics.

Subcommittee D-20.60 on Syntactic Foam held two meetings during the year: in Atlantic City, N. J. on June 26, 1969 and in Detroit, Mich. on Oct. 28, 1969. The scheduled third meeting of March 3, 1970 was attended by the chairman only. The subcommittee consists of 35 individuals of whom 32 are voting members. Eight members are classed as producers; 22 are consumers and two have general interest. The subcommittee consists of four sections: Hollow-Sphere Filler, Syntactic Foam Test Methods, Non-destructive Test Methods, and Specifications for Syntactic Foam. Effective February 1970, Israel Resnick resigned as chairman of Subcommittee D-20.60. J. J. Gennari was appointed chairman in his place.

Tentative Methods D 2736-68 T, Test for Hydrostatic Compressive Strength of Syntactic Foam, describes a rapid means for obtaining the values desired. A draft for an alternate method of achieving similar results, as for the first method, has been balloted by the subcommittee for inclusion in one document.

A tentative method for Bulk Modulus of Elasticity of Syntactic Foam was approved by Subcommittee D-20.60. In preparation by Section 1 are three test methods for Hollow-Sphere Fillers: "Hydrostatic Compressive Strength", "Bulk Density and Packing Factor" and "Alkalinity". Due to lack of a section chairman for "Nondestructive Testing" and attendance of members familiar with such techniques, progress has been minimal.

Subcommittee D-20.62 (ISO/TC 5/SC 6) does not fulfill the usual function of ASTM committees or subcommittees. Its very small membership comprises technicians who are confirmed to this subcommittee by the American National Standards Institute. Its purpose is to act as a sounding board for ANSI in the determination of the United States position on ISO/TC 5/SC 6 recommendations, policies, and draft proposals. At the discretion of ASTM D-20.62 members, they may further seek the advice and recommendations of the entire membership of Subcommittee D-20.17. During this past year the subcommittee has recommended a number of positions to the American National Standards Institute, which it is unnecessary to detail here. It is expected that some members of ASTM D-20.62 will attend the meetings of ISO/TC 5/SC 6, which are usually held somewhere in Europe at roughly eighteen-month intervals. Confirming delegates to these meetings is a prerogative and function of the American National Standards Institute.

Subcommittee D-20.70 on Analytical Methods (D. W. Riley, chairman)—A number of standardized techniques to characterize polymer structures are being investigated; these have evolved from complex research projects in the past two decades. Light scattering and osmometry are being studied with the hope of writing methods for these techniques. Gel permeation chromatography is receiving intensive attention toward the

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drafting of a method. New ways of extracting polymeric plasticizers are being devised. Analyses of polymers and copolymers for their component parts are being developed spectroscopically. A new technique was introduced this year for sensing the permeation of gas through a plastic film; the Dow people have coupled a mass spectrometer to the permeability cell to detect penetrating gases more sensitively.

Subcommittee D-20.80 on Reinforced Thermoplastics (D. N. Hogg, chairman) is continuing its activities in the development of test methods and specifications for thermoplastic materials containing various reinforcements. The proposed method of test for Measurement of Tensile Creep and Creep Rupture of Reinforced Thermoplastics is nearing completion. Task group activity has been initiated to investigate methods of determining impact strength of reinforced thermoplastics. A proposed specification for Reinforced and Filled Nylon Injection Molding and Extrusion Materials has been submitted to the Society. Development of a specification for Glass Reinforced Acetal Plastics for Molding and Extrusion is nearing completion. Development of a specification for Reinforced Styrenic Materials has been temporarily suspended until some results of the impact strength test investigations are available.

Subcommittee D-20.90 on Specimen Preparation (R. A. Wiinikainen, chairman)—A report on the interlaboratory study of compression molding of ABS materials is being prepared; this will be circulated to Section 01 with the ballot on the method. The second phase of the study of allyl compound specimen preparation by compression molding is nearly complete. Work on compression molding of PVC has resumed. Some laboratories have found that the fire-cavity transfer mold for thermosetting plastic test specimens which is shown in Recommended Practice D 647 is too cumbersome and expensive. Therefore, alternative single-cavity molds have been designed and approved by Section 04. This section has also prepared a revision of Recommended Practice D 1896

to provide conditions appropriate for transfer molding of epoxy materials. The title of Section 04 was changed to "Transfer Molding of Test Specimens." This more accurately reflects the present scope of the section. The subcommittee approved an editorial revision of Recommended Practice D 1897. This was required because of changes in D 2473, Specification for Polycarbonate Plastic Materials. Consideration is being given to deletion of Recommended Practice D 1130. If it is dropped, some parts of it will probably be incorporated into D 1897. Sections 08 on Injection Processes and 12 on Machining were declared inactive. No projects have been suggested in these areas recently.

Subcommittee 20.92 (formerly 20.04) on Definitions (R. B. Waller, chairman) has continued to review the older definitions in D 883, Standard Nomenclature Relating to Plastics, considering other ASTM definitions, as requested by Committee E-8, ISO/TC 61, and IUPAC definitions for each term. The Subcommittee reviewed 115 definitions. It has voted to reaffirm 35, revise 43, delete 27 and add three new definitions. The Subcommittee voted to withdraw D 1009, Recommended Code for Designating Form of Material and Direction of Testing Plastics, and add four abbreviations to D 1600, Standard Abbreviations of Terms Relating to Plastics. The subcommittee will continue to review the standards with consideration given to definitions and abbreviations promulgated by other ASTM Committees, IUPAC, and ISO/TC 61 and will act on requests made by the subcommittees of Committee D-20. Liaison will be maintained with Committees C-24 (Sealants), D-11 (Rubber), D-13 (Textiles), D-14 (Adhesives), E-8 (Definitions) and F-3 (Gaskets) in an effort to standardize definitions for terms of mutual concern.

Respectfully submitted on behalf of the committee,

G. H. WILLIAMS JR.
Chairman

C. B. HOWARD,
General Secretary

REPORT OF COMMITTEE D-21 ON POLISHES

Committee D-21 on Polishes (formerly Wax Polishes and Related Materials) held one meeting during the year in Tulsa, Okla., on Oct. 9 to 10, 1969. In addition, the newly formed Subcommittee VI on Slip Resistance met in Chicago, Ill., on Nov. 10, 1969.

Additions and changes during the year brought the membership to 75, of whom 42 are classified as producers, 12 as consumers, 19 as general interest members, and 2 as consulting members.

Committee D-21 members approved an amendment to its bylaws changing its name from "Wax Polishes and Related Materials" to "Polishes." At the same time it approved a revision of scope to read as follows: "The promotion of knowledge, stimulation of research and the development of specifications, methods of test, definitions of terms and recommended practices, relating to polishes."

Upon his retirement from the National Bureau of Standards, Dr. William W. Walton, former chairman and an Honorary Member of Committee D-21, was paid special recognition through a letter of resolution by unanimous action of the Executive Subcommittee and authorized by Messrs. Kimball and Sinsheimer.

J. G. Sinsheimer, past secretary of Committee D-21 was elected vice-chairman to fill the post left vacant by the death of B. S. Johnson, and D. R. Gehman, former assistant secretary, was appointed secretary. The assistant secretary post will temporarily remain unfilled. C. L. Weirich was appointed chairman of the newly created Subcommittee VI on Slip Resistance (formerly a task force in Subcommittee IV). The officers elected for the ensuing term of two years are as follows:

Chairman, C. S. Kimball
Vice-Chairman, J. G. Sinsheimer
Secretary, D. R. Gehman

RECOMMENDATIONS ACCEPTED BY THE COMMITTEE ON STANDARDS

Subsequent to the 1969 Annual Meeting, Committee D-21 presented to the Society through the Committee on Standards the following recommendations which became effective on the date indicated:

New Tentative:

D 2834 - 69 T, Method of Test for Non-volatile Matter (Total Solids) in Water Emulsion Waxes, Solvent Based Waxes, and Polymer Emulsion Floor Polishers (Subcommittee III) (effective Sept. 19, 1969)

This method represents a consolidation and revision of Methods D 2046 and D 1289, involving specific nonvolatile matter (total solids), to include all polishes within the scope of Committee D-21.

D 2869 - 70 T, Method of Test for Black Heel Marking Tendencies of Waxes and Polymer Floor Finishes (Subcommittee IV) (effective March 19, 1970)

This method provides a simple procedure for measuring the tendency of waxes and polymer floor finishes to be marked by black heels. This test is designed as a laboratory run correlation of actual floor performance.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee D-21 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which became effective on the dates indicated:

REPORT OF COMMITTEE D-21

New Standard:

D 2825 - 69, Definitions of Terms Relating to Wax Polishes and Related Materials (Subcommittee I) (effective Sept. 19, 1969)

The list of 17 definitions published as proposed definitions for information only in June 1965 and listed in Part 22 of the *Book of ASTM Standards* was approved as Standard D 2825.

Adoption of Tentative as Standards Without Revisions:

D 2048 - 69, Method of Test for Powdering of Floor Polishes (Subcommittee IV) (effective Nov. 7, 1969)

Adoption of Tentative as Standard With Revision:

D 2047 - 69, Method of Test for Static Coefficient of Friction of Polish-Coated Floor Surfaces as Measured by the James Machine (Subcommittee IV) (effective Nov. 7, 1969)

This method was editorially revised.

Withdrawal of Standard:

D 1289 - 64, Method of Test for Nonvolatile Matter (Total Solids) in Water Emulsion Waxes (Subcommittee III) (effective Sept. 19, 1969)

Withdrawal of Tentative:

D 2046 - 64 T, Method of Test for Nonvolatile Matter (Total Solids) in Solvent-Based Waxes (Subcommittee III) (effective Sept. 19, 1969)

Methods D 1289 and D 2046 have been replaced by new Tentative Method D 2834, Test for Nonvolatile Matter (Total Solids) in Water Emulsion Waxes, Solvent Based Waxes, and Polymer Emulsion Floor Waxes.

AMERICAN NATIONAL STANDARDS

The following standard was recommended for submission to the American National Standards as an American National Standard:

D 2825 - 69, Def. of Terms Relating to Wax Polishes and Related Materials

ACTIVITIES OF SUBCOMMITTEES

Subcommittee I on Nomenclature (Paul McQuillan, chairman) has proposed definitions for "Detergent Resistance" and "Removability" which are to be balloted by the committee members. Under development at the current time also are the terms "Polishes" and "Accelerated Aging Tests."

Subcommittee II on Raw Materials (H. Mellan, chairman) will submit to the Society methods of testing emulsion polymer latices for use in floor finishes upon completion of editorial revision.

Subcommittee III on Physical and Chemical Testing (F. Kraatz, chairman) revised and combined current methods of test for nonvolatile matter into a new tentative, D 2834 - 69 T.

Subcommittee IV on Performance Tests (A. L. Forchielli, chairman) is continuing work in the preparation of test methods for buffability of floor polishes, recoatability of floor polishes, color of dried films of water emulsion floor polishes, and detergent resistance of floor polishes. A method of test for rubber heel marking has been approved and the editorial revision submitted to the Society. The task force on slip resistance has been removed from Subcommittee IV and raised to subcommittee status (Subcommittee VI). Further round-robin tests are being conducted by the task forces on recoatability, buffability, and detergent resistance.

Subcommittee V on Specifications (Norman Bernat, chairman) has been inactive during the year.

Subcommittee VI on Slip Resistance (C. L. Weirich, chairman) was created this year. A meeting in November 1969 was held to establish a title and scope, review all existing slip measurement methods, and to review requirements and correlation with Underwriters' Laboratories. Three task forces have been established.

Respectfully submitted on behalf of the committee,

C. S. KIMBALL,
Chairman

D. R. GEHMAN,
Secretary

REPORT OF COMMITTEE D-22 ON SAMPLING AND ANALYSIS OF ATMOSPHERES

Committee D-22 on Sampling and Analysis of Atmospheres held two meetings during the year: on Nov. 10 to 12, 1969, at ASTM Headquarters in Philadelphia, Pa., and on May 6 to 8, 1970, in Ann Arbor, Mich.

A conference on Analytical Methodology in Sampling and Analysis of Atmospheres has been scheduled for July 6 to 10, 1970, at Johnson State College, Johnson, Vt.

Detailed plans for a program for evaluation of methods of sampling and analysis of atmospheres have been completed. Paid co-operators will form the basis for this evaluation and plans have been made for raising up to \$2,000,000, by solicitation of industry, to evaluate approximately 40 methods over a two-year period.

A proposed recommended practice for evaluation of laboratories engaged in sampling and analysis of atmospheres has been approved by the committee for submittal to the Committee on Materials Inspection and Testing Laboratories for further action.

The following committee officers and members-at-large of the executive committee have been elected for a two-year term beginning at the close of the 1970 Annual Meeting of the Society:

Chairman, P. M. Giever

Vice-Chairman, B. T. H. Levadie

Secretary, E. C. Tabor

Members-at-Large: S. K. Kempner, F. N. Megahan, J. T. Ferguson

RECOMMENDATIONS ACCEPTED BY THE COMMITTEE ON STANDARDS

Subsequent to the 1969 annual report, Committee D-22 presented to the Society through the Committee on Standards the following recommendations which were accepted effective on the dates indicated:

New Tentatives:

D 2820 - 69 T, Method of Test for C_1 Through C_8 Hydrocarbons by Gas Chromatography (Subcommittee IV) (effective July 16, 1969)

This procedure is intended for measuring the concentrations of individual C_1 through C_8 hydrocarbons in the atmosphere. The lower limit of measurement is 0.01 parts per million (ppm) by volume. Elution of 17 hydrocarbons is accomplished within 16 min.

D 2913 - 70 T, Method of Test for Mercaptan Content of the Atmosphere (Subcommittee II) (effective Oct. 15, 1970)

This method determines total mercaptans and does not differentiate among individual mercaptans. The sample is obtained by aspirating a measured volume of air through an aqueous solution of acetate-acetic acid and evaluating by spectrophotometric measurement of the red complex. The method is designed for concentrations of mercaptans in range below 200 $\mu\text{g}/\text{m}^3$.

D 2924 - 70 T, Method of Test for Sulfur Dioxide Content of the Atmosphere (West-Gaeke Method) (effective Oct. 15, 1970)

This is a colorimetric method in which the sample is collected in a solution of potassium or sodium tetrachloromercurate, which forms a dichlorosulfitomercurate with final evaluation spectrophotometrically. The method is applicable to concentrations below 0.01 ppm.

The new tentatives appear in the 1970 *Annual Book of ASTM Standards*, Part 23.

REPORT OF COMMITTEE D-22

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee D-22 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which were accepted by the Society on the dates indicated:

New Standard:

D 2912 - 70, Method of Test for Content of Oxidizing Substances in the Atmosphere (Subcommittee II) (effective Oct. 15, 1970)

This method covers the determination of low concentrations of ozone plus other oxidants such as nitrogen dioxide, chlorine, peroxyacyl nitrate, and hydrogen peroxide which may be present in the atmosphere.

Revision of Standard, Immediate Adoption:

D 1739 - 70 (formerly D 1739 - 62), Method of Collection and Analysis of Dustfall (Subcommittee II) (effective Oct. 15, 1970)

The method sets forth type and size of dustfall collector units, and terms for expressing concentration. The revision was primarily editorial.

The new standard and revision appear in the 1970 *Annual Book of ASTM Standards*, Part 23.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee II on Methods of Sampling and Analysis (J. B. Pate, chairman) has in the subcommittee letter ballot stage methods of

test for ozone, nitrogen oxides, chlorides, sulfur dioxide-sulfur trioxide, formaldehyde, and sulfation plate. Under development are revisions of: Recommended Practices D 1605 - 60, for Sampling Atmospheres for Analysis of Gases and Vapors, recommended practices for automated analyses, and methods of test for sulfur dioxide (conductimetric), hydrogen sulfide by impregnated tape, ammonia, aldehydes, phenols, and high-volume plus water solubles.

Subcommittee IV on Gas Chromatographic Methods (E. E. Escher, chairman) is developing a gas chromatographic method for carbon monoxide and methane in ambient air, a method of reporting sensitivity of flame ionization detectors, a method of continuous atmospheric monitoring for total hydrocarbons by the flame ionization method, and a method of test for methane-total hydrocarbons.

Subcommittee V on Calibration (R. L. Chapman, chairman) has under development methods for calibration of high-volume samplers, of spinning syringes, of diffusion tubes, of flow meters, of oxidant analyzers, of the "bag" method, of particulate air samplers, and of gas cylinder standards.

Subcommittee VII on Particulates (Physical Analysis) (W. J. Smith, chairman) is working on a DOP method of evaluation of air assay media and on impaction methods for sampling and analysis of airborne particulates.

Respectfully submitted on behalf of the committee,

P. M. GIEVER,
Chairman

FRANCIS SCOFIELD,
Secretary

REPORT OF COMMITTEE D-23 ON CELLULOSE AND CELLULOSE DERIVATIVES

Committee D-23 on Cellulose and Cellulose Derivatives held its main meeting in New York, N. Y., on Sept. 7, 1969, and an interim meeting in New York, N. Y., on Feb. 15, 1970.

The total membership of Committee D-23 is 63, consisting of 48 voting, 14 consulting, and 1 honorary, members. The voting members represent 35 active organizational units comprising 17 general interest, 9 consumer, and 9 producer groups. There are currently 2 unfilled organizational memberships. Five memberships were lost during the year, 3 by resignation and 2 because of nonparticipation for the past 4 years. Five consulting members were also dropped for inactivity in responding to ballots.

Committee D-23 plans to sponsor a symposium on instrumental methods for the analysis of cellulose and its derivatives at the annual TAPPI meeting to be held in New York, N. Y., in February 1971. Murray McLeod is serving as chairman of this symposium group. A full day's session involving 8 to 10 papers is contemplated.

J. J. Cramer has replaced F. E. Woodward as Committee D-12 on Soaps and Other Detergents, representative to Committee D-23. Committee D-9 on Electrical Insulating Material will no longer have a formal representative to Committee D-23. Instead, Bill Lawford of D-9 and Murray McLeod will maintain an informal liaison between the two committees. John Enders replaces Carl Gilbert as chairman of Subcommittee D-23.40. Carl was extended a vote of appreciation for his many years of service to D-23.

The following officers were elected by Committee D-23 letter ballot for the ensuing two-year term:

Chairman, M. A. Millett
Vice-Chairman, Joe Alexander

RECOMMENDATIONS ACCEPTED BY

THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee D-23 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which became effective in 1970:

Reapproval of Standards:

D 1915 - 63 (1970), Method of Test for Chromatographic Analysis of Chemically Refined Cellulose (Subcommittee II)

D 1926 - 63 (1970), Method of Test for Carboxyl Content of Cellulose (Subcommittee II)

These standards appear in the *Annual Book of ASTM Standards*, Part 15.

ANSI STANDARDS

The following standards have been approved during the year as American National Standards by the American National Standards Institute:

D 914 - 69; ANSI K65.43-1970, Methods of Testing Ethylcellulose

D 1343 - 69; ANSI K65.25-1970, Method of Test for Viscosity of Cellulose Derivatives by Ball-Drop Method

ACTIVITIES OF SUBCOMMITTEES

Subcommittee D-23.92 on Nomenclature and Definitions (no current chairman) is on standby status.

Subcommittee D-23.96 on Statistics (Dave Yandle, chairman) is on standby status.

Subcommittee D-23.97 on Long-Range Planning (Verne Tripp, chairman) has no progress to report.

Subcommittee D-23.20 on Cellulose (W. J. Alexander, chairman) has added three new members to its roll: Murray McLeod of CIP Research, Ltd., Lyle Phifer of American

REPORT OF COMMITTEE D-23

Viscose Div., FMC Corp., and Reavis Sproull of Biodegradables.

The Task Group on Gas Chromatographic Analysis of Pulp Constituents (Max Folsom, chairman) worked up new analytical instructions based on the results and comments obtained in their first round robin. These were ready by April 1, following which a set of instructions and a set of sugar mixtures were sent to participants in a second round robin. Both the trimethylsilyl ether and the alditol acetate methods are to be evaluated.

The Task Group on Molecular Weight Distribution by Gel Permeation Chromatography (Leon Segal, chairman) has added John Dyer of American Viscose Div., FMC Corp., and personnel from ITT Rayonier to its roll. Papers by several members have been presented at recent ACS symposia. It is not the immediate objective of this task group to come up with a standard method. Rather, the task group will keep abreast of all new developments. Only when the techniques have reached a more advanced or mature stage will consideration be given to the preparation of a standard method.

The Task Group on X-Ray Fluorescence Spectroscopy for Determining Trace Metals in Pulps (Lyle Phifer, chairman) has now been organized. Its objective is to develop a broad-based method applicable to the many inorganic elements of concern in cellulose and cellulose derivatives. This technique is rapid and lends itself to routine use.

The Task Group on Colorimetric Methods for Iron and Manganese in Cellulosics (Fred Ponko, chairman) has assembled a tentative method for review by the membership. For iron, thiocyanate appears to be a better indicator to use with cellulose, and ortho-phenanthroline works better for cellulose derivatives.

The Task Group on Wet Chemical Methods for Copper and Calcium (Murray McLeod, chairman) has found that a fluorescent indicator provides the most promising results. However, this would demand that the user purchase ultraviolet equipment. The method may be written so as to include these indicators; an *A* procedure calling for the use of the fluorescent indicator, and a *B* procedure based on a visual indicator. Reference would also be given to the X-ray and atomic absorption procedures if they have become standards.

The Task Group on Recommended Practices for Ashing Cellulose (Joe Alexander, chairman) still has some experimental details to work out before their methods are ready for ballot.

Subcommittee D-23.30 on Organic Esters (Leo Genung, chairman) has completed its work on the method for sulfur and sulfate content of celluloses by X-ray fluorescence. It is now considering revision or reaffirmation of Methods D 871-63, Testing Cellulose Acetate. When this is done, the subcommittee will be on standby basis.

Subcommittee D-23.40 on Inorganic Esters (John Enders, chairman) is on standby status.

Subcommittee D-23.50 on Cellulose Ethers (John Ness, chairman) has reviewed Methods D 1347-64 (methylcellulose) and D 1439-65 (sodium carboxymethylcellulose) and reaffirmed them with a few editorial changes. They will now go out for D-23.00 letter ballot. Jim Holton is working up a method for iron in all cellulose ethers. A round robin is about to get under way on a method for determining molar substitution in hydroxyethyl cellulose with Nate Eastman as chairman.

Subcommittee D-23.60 on Instrumental Methods of Analysis (Lyle Phifer, chairman) —Many of the task groups concerned with instrumental methods of analysis have involved members from a number of subcommittees. This has created confusion as to which subcommittee has official jurisdiction. At our interim meeting, Subcommittee D-23.20 recommended, and received unanimous approval, that a new subcommittee be established to concern itself exclusively with the newer instrumental methods for cellulose analysis. Thus, Subcommittee D-23.60 has been created. The Task Groups on Molecular Weight Distribution by Gel Permeation Chromatography, Gas Chromatographic Analysis of Pulp Constituents, X-Ray Fluorescence Spectroscopy for Inorganics in Pulps, and Atomic Absorption Spectroscopy for Trace Metals in Pulps will now fall under this new subcommittee.

Respectfully submitted on behalf of the committee,

F. G. HURTUBISE,
Chairman

M. A. MILLETT,
Secretary

REPORT OF COMMITTEE D-24 ON CARBON BLACK

Committee D-24 on Carbon Black held two meetings during the year: on June 24 and 25, 1969, in Atlantic City, N. J., and on Dec. 9 and 10, 1969, in Cincinnati, Ohio.

The committee consists of 81 voting members, of whom 33 are classified as producers, 33 as consumers, and 15 as general interest members.

Several changes in the committee bylaws were approved by the committee. One additional change limiting the term of chairman of subcommittees to six years was approved at the 1970 Annual Meeting.

The committee worked jointly with Committees D-11 and D-20 to sponsor a symposium on the dispersion of carbon black in rubber and plastics at the June 1970 meeting in Toronto.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee D-24 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which were accepted by the Society effective on the dates indicated:

Adoption of Tentatives as Standards Without Revision:

D 1618 - 70 (formerly D 1618 - 65 T), Method of Test for Benzene Discoloration by Carbon Black (Subcommittee D-24.30) (effective July 24, 1970)

D 2414 - 70 (formerly D 2414 - 65 T), Method of Test for Dibutyl Phthalate Absorption Number of Carbon Black (Subcommittee D-24.20) (effective June 12, 1970)

Adoption of Tentative as Standard with Revision:

D 1937 - 70 (formerly D 1937 - 62 T), Method of Tests for Mass Strength of Pelleted Carbon Black (Subcommittee D-24.10) (effective May 29, 1970)

Revised to conform with present industry practice.

Revision of Standard:

D 1510 - 70 (formerly D 1510 - 69), Method of Tests for Iodine Adsorption Number of Carbon Black (Subcommittee D-24.20) (effective April 13, 1970)

Revised to show differences in method of preparing solutions may be related to inter-laboratory test error.

Reapproval of Standards:

D 1506 - 59 (1969), Method of Test for Ash Content of Carbon Black

D 1508 - 60 (1969), Method of Test for Fines Content of Pelleted Carbon Black

D 1509 - 59 (1969), Method of Test for Heating Loss of Carbon Black

D 1511 - 60 (1969), Method of Test for Pellet Size Distribution of Carbon Black

D 1512 - 60 (1969), Method of Test for pH Value of Carbon Black

D 1513 - 60 (1969), Method of Test for Pour Density of Pelleted Carbon Black

D 1514 - 60 (1969), Method of Test for Sieve Residue from Carbon Black

D 1619 - 60 (1969), Methods of Test for Sulfur Content of Carbon Black

D 1620 - 60 (1969), Method of Test for Volatile Content of Carbon Black

The new and revised standards will appear in the 1971 *Annual Book of ASTM Standards*, Part 28.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee D-24.10 on Physical Tests (J. F. Svetlik, chairman). Repeatability and

REPORT OF COMMITTEE D-24

reproducibility statements for fines (D 1508), sieve residue (D 1514), pour density (D 1513), and mass pellet strength (D 1937) were approved for inclusion in the procedures.

Various methods for the determination of surface area by gas adsorption were not approved in letter ballot because of questions raised about the reproducibility in the round-robin tests. A task group is working on improving test reproducibility and recommendations were made at the June 1970 meeting.

Pellet hardness testers are being considered for future study.

Subcommittee D-24.20 on Chemical Tests (A. E. Daniell, chairman). Repeatability and reproducibility statements for ash (D 1506), pH (D 1512), and sulfur (D 1619) were approved for inclusion in the procedures.

A task group studied data on heat loss (D-1509) and recommended precision statements for consideration at the June meeting.

Precision statements on dibutyl phthalate absorption (D 2414) will be withheld until Subcommittee D-24.60 recommends the preferred wording. Method D 2414 was approved for adoption as standard without the precision statements.

A task group prepared a calibration procedure for D 2414 for presentation at the June 1970 meeting. A second task group studied carbon black sample size in D 2414.

Six carbon blacks were approved as official calibration samples for D 2414. The official values on the calibration blacks are:

N-762	SRF	66
N-774	SRF-HM	81
N-660	GPF	85
N-765	SRF-HS	106
N-347	HAF-HS	123
IRB No 2		92.3

The need to delete or change the volatile limitation in the scope of iodine adsorption number (D 1510) was the subject of discussion at the June meeting.

The proposed revised volatile content test was tabled until the results of a letter ballot removing D 1620 from the *Annual Book of ASTM Standards* reported at the June meeting.

Subcommittee D-24.30 on Optical Tests (J. E. Smith, chairman)—The task group assigned to recommend methods of test for the electron microscope analysis of particle size reported in June.

A task group to develop an improved discoloration test issued a report on Nov. 24, 1969. The modified procedure using orthodichlorobenzene, which was proposed by the task group, could be used in place of, or in addition to, the present benzene procedure (D 1618). Committee action on the task group recommendations took place in June.

A proposed tinting strength test method is being evaluated by a task group. All available reflectance measuring instruments should be included in this evaluation.

A task group studying the Nigrometer 3 to measure blackness was discontinued on recommendation of the task group chairman.

Subcommittee D-24.04 on Nomenclature (J. H. Gifford, chairman)—The committee approved by letter ballot definitions for carbon black, structure of carbon black, and microstructure of carbon black.

Negative ballots on persistent structure of carbon black and on transient structure of carbon black could not be resolved. These definitions are not approved and will be studied further.

Subcommittee D-24.60 on Statistical Analysis (C. McCormick Jr., chairman) continued to provide aid and advise other technical committees in the design of interlaboratory testing programs and the evaluation of data.

Subcommittee D-24.70 on Classification (J. Macht, chairman) approved for letter balloting the modulus and tensile values of IRB-3 relative to IRB-2.

The change in Table 1 of Classification D 1765 from property ranges to typical values was largely completed.

Because of the inability to resolve negative votes on thermal blacks, producers were requested to submit typical data for restudy.

Respectfully submitted on behalf of the committee,

R. H. GERSTER,
Chairman

F. LYON,
Secretary

REPORT OF COMMITTEE

D-25 ON CASEIN AND SIMILAR PROTEIN MATERIALS

Committee D-25 on Casein and Similar Protein Materials, met last in January 1968 at the winter meeting in Atlantic City, N. J. Efforts to designate a roster of eligible members to serve as officers have not been successful, thus precluding the scheduling of subsequent meetings.

The committee consists of 19 active members, classified as 4 producers, 8 consumers, and 7 general interest members. Five of these members constitute an Advisory Sub-

committee. Other subcommittees are on inactive status, the committee acting as a whole on matters pertaining to methods. A group of 12 nonvoting consulting members and 2 honorary members complete the roster.

Respectfully submitted on behalf of the committee,

EARL MAYNARD,
Chairman

H. K. SALZBERG,
Secretary

REPORT OF COMMITTEE D-26 ON HALOGENATED ORGANIC SOLVENTS

Committee D-26 on Halogenated Organic Solvents held two meetings during the year: in Atlantic City, N. J., June 26 and 27, 1969; and Cincinnati, Ohio, Dec. 10 and 11, 1969. A number of subcommittees and task groups met independently in conjunction with the main committee meetings.

The committee consists of 57 voting members, of whom 31 are classified as producers, 14 as consumers, and 12 as general interest members.

The officers elected for the ensuing term of two years beginning June 1970, are as follows:

Chairman, W. H. Wade
Vice-Chairman, C. M. Smith
Secretary, J. H. Rains

ACTIVITIES OF SUBCOMMITTEES

Subcommittee II on Vapor Degreasing (C. Kircher, chairman) has completed a second edition of *ASTM STP 310, Handbook of Vapor Degreasing*, and continued the formulation of appropriate specifications for all chloro and/or fluorinated hydrocarbon solvents considered capable of utilization in standard vapor degreasing equipment. The revised edition also contains new information on the utility and limitations of methylchloroform, methylene chloride, and fluorinated hydrocarbons as well as the more commonly used chlorinated solvents.

Subcommittee III on Cold Cleaning (M. Z. Poliakov, chairman) has completed the editing of an addendum to *ASTM STP 403, Cold Cleaning with Halogenated Solvents*, covering all phases of solvent cold cleaning in the electrical equipment and power industry. Work continues on the development of specifications for the three solvent blends

currently undergoing toxicological investigation at Kettering Laboratories. Although a task group is still continuing the accumulation and indexing of a comprehensive bibliography of literature and test methods relating to cold cleaning with halogenated solvents and their admixtures, lagging general interest has temporarily shelved previously contemplated plans for publication.

Subcommittee IV on Test Methods (C. A. Begun, chairman) has continued the development of test methods as requested by subcommittees formulating halogenated hydrocarbon specifications and concentrated on a program of reevaluation of current ASTM halogenated solvents tentatives and standards. The revision of several existing standards and numerous new test procedures are currently under study.

Subcommittee V on Industrial Hygiene (L. J. Silverstein, chairman) has continued assisting Subcommittees II and III in the revision of *ASTM STP 310, Handbook of Vapor Degreasing*, and *ASTM STP 403, Cold Cleaning with Halogenated Solvents*. Final arrangements were made with Kettering Laboratories of Cincinnati, Ohio, to conduct government sponsored research dealing with the joint toxic action of halogenated hydrocarbons and their admixtures. Some preliminary data have been collected on the effects of oral ingestion, skin exposure, or vapor inhalation of some of the suggested solvent blends.

Respectfully submitted on behalf of the committee.

W. H. WADE,
Chairman

C. L. CORMANY,
Secretary

REPORT OF COMMITTEE

D-27 ON ELECTRICAL INSULATING LIQUIDS AND GASES

Committee D-27 on Electrical Insulating Liquids and Gases has held three meetings during 1969. The usual Spring meeting was held at the Hotel Dinkler Plaza in Atlanta, Ga., on March 3-5, 1969. The Summer meeting held in conjunction with the Annual Meeting of the Society opened at Chalfont-Haddon Hall in Atlantic City, N. J., on June 23-25, 1969. The Fall meeting was convened at the Shoreham Hotel in Washington, D. C., on Oct. 6-8, 1969.

Both the total membership and the number of voting representatives have decreased during 1969. The membership of all classes now stands at 95, with 24 producers, 51 consumers, and 20 general interest members. The voting representatives number 78, with 20 producers (25.6 percent), 39 consumers (50 percent), and 19 general interest (24.4 percent).

Because of the wide range of interest among the members, they are classified in their voting on committee letter ballots by their interest and connection with the question at hand. A ballot on a general question usually is answered by the voting membership in its assigned role, whereas on specific questions such as on askarels, there is a significant rise in the general interest vote. As Society regulations require the vote of producing members to be less than 50 percent, the committee meets this requirement without difficulty.

The introduction of the Interim Procedure for Standards several years ago has made the acceptance of standards more direct, revisions are swiftly processed, and the delays formerly experienced in waiting for acceptance at the Annual Meeting have been eliminated. Yet the same safeguards are scrupulously observed in the acceptance of these standards, and the spreading of this work evenly over the year has made it possible for the Committee on Standards to be

more precise and more thorough in its judgment of the new procedures. Committee D-27 has adopted many of its tentative methods as standard and has offered new methods as standard without the preliminary tentative period in accordance with the Society's request. The committee looks with favor upon the decision to limit tentative procedures to a three-year life with no extension permitted. The decision to review and reaffirm methods of five years standing should result in the elimination of certain methods which have outlived their usefulness.

Perhaps the liaison representation of the greatest interest is the connection with the International Electro Technical Commission (IEC), and with the Conference Internationale des Grands Reseaux Electriques (CIGRE). E. L. Raab is the chief U. S. representative on these European organizations. The IEC oil group is divided into three sections as follows:

TC-10A—Mineral Oils and Liquids from Petroleum (E. L. Raab)

TC-10B—Synthetic Materials, Non-Petroleum (P. G. Benignus)

TC-10C—Dielectric Gases (T. A. Dakin)

The IEC is more active on subjects similar to those handled by ASTM, whereas CIGRE corresponds to some extent with the IEEE in the United States.

The present work of the IEC is quite diversified. They are preparing an insulating oil specification. They are developing an oxidation test for inhibited insulating oils and a base oil specification to which an inhibitor may be added. This should be ready within the next year. A comprehensive sampling procedure is nearing completion, and the gassing of insulating oils under electric stress is being studied. Work on other liquid insulants, polybutenes, and non-petroleum materials is under way. The initial discussions in

REPORT OF COMMITTEE D-27

Committee D-27 on impulse testing are being followed with interest.

Another liaison activity is that of the Insulating Fluids Subcommittee of the IEEE, of which E. L. Raab is chairman. After several years of trial, the Oil Guide has now been printed and is available through IEEE Headquarters in New York City.

This same group is preparing a guide for the use of askarels, but this is still being reviewed and will be delayed until next year. The IEC is following the preparing of these guides closely and may pattern their oil guide after that published by the IEEE.

The Joint D-9/D-27 Liaison Group, formed three years ago to discuss questions where encroachment on the prerogatives of either committee seemed imminent, has proved its worth in settling border problems to the mutual satisfaction of both committees. The chairmanship was held by the late F. L. Williams until the meeting in September 1969. The present chairman is C. R. Johnson of Committee D-27, who continues until September 1970, when the post reverts to Committee D-9.

Activities of Committee D-2 on Petroleum Products and Lubricants that may be of particular interest to Committee D-27 are followed by H. W. McCulloch, Jr. The method for saponification number (D 94) is under the joint jurisdiction of D-2 and D-27, while the method for neutralization number (D 974), is under D-2. However, certain minor improvements in D 974 developed by Committee D-27 have been approved by both committees with greater precision and reproducibility being achieved.

Several years ago, the first set of bylaws for the committee was prepared by F. S. Oliver. This activity was ably handled later by A. M. Gates until his retirement last summer, when R. H. Kershaw took up the ever-present task. Changes in the Society's Regulations for Technical Committees are regularly reviewed and incorporated in the Committee D-27 bylaws. This guide to requirements and basis for membership on the committee is mailed to new applicants by the membership secretary.

An important change has occurred in the designation of national specifications. The new appellation will be "American National Standards Institute, Inc. Standards" (ANSI),

which replaces "United States of America Standards Institute Standards" (USASI). Standard methods of Committee D-27 are at present recommended to E. L. Raab, who represents Committee D-27 on Committee C59, for consideration by C59 as ANSI standards. Later, this recommendation will become automatic as new standards are approved, but no tentative methods may be considered for ANSI approval. Where a Committee D-27 method is approved as an ANSI Standard, its designated number will appear on the cover page of each individual method in the upper right-hand corner.

The panel discussions inaugurated by V. R. Mulhall two years ago have replaced the more elaborate symposia, where the necessary editing of the comments was becoming a burdensome chore. R. L. Peeler has taken over this activity, and his enthusiastic approach has been rewarded by the interested participation of the audience at the sessions held last March and in October. These discussions will be continued in 1970 at Cincinnati in March and in Williamsburg in October.

As the year came to a close, the sorrowful news was received of the death on December 30th of our distinguished member, Dr. Frank C. Doble, the founder of the Doble Engineering Co. in Belmont, Mass. His membership dates back to 1935 to the days of the old Subcommittee IV of Committee D-9. He saw the new Committee D-27 formed in 1959 and was one of the early members of the Steering Committee under the late F. M. Clark. His tireless collaboration in round-robin series contributed much to the reproducibility of the committee methods. R. I. Lowe has been chosen to carry on the programs of the Doble organization.

The officers of technical committees are elected for terms of two years. In order to prepare for the election held in March 1970, E. L. Raab appointed a Nominating Committee of which H. W. McCulloch, Jr., was chairman assisted by R. M. Frey and E. L. Morrison. A slate of officers was presented at the March meeting and balloted after that meeting. The following officers were elected:

Chairman, T. K. Sloat
Vice-Chairman, C. E. Trautman
Recording Secretary, C. A. Johnson
Membership Secretary, Ed Kershaw

REPORT OF COMMITTEE D-27

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURES FOR STANDARDS

Subsequent to the 1969 Annual Meeting, Committee D-27 submitted the following recommendations to the Society for action under the Interim Procedure for Standards which were accepted by the Society effective on the dates indicated.

New Standard:

- D 2864 - 70**, Definitions of Terms Relating to Electrical Insulating Liquids and Gases (Subcommittee D) (effective April 13, 1970)

Adoption of Tentatives as Standards Without Revision:

- D 2413 - 69**, Methods for Preparing and Electrical Testing of Insulating Paper Impregnated with a Liquid Dielectric (formerly D 2413 - 65 T) (Subcommittee N) (effective Nov. 14, 1969)
- D 2472 - 69**, Specification for Sulfur Hexafluoride (formerly D 2472 - 66 T) (Subcommittee B) (effective Nov. 14, 1969)
- D 2477 - 69**, Method of Test for Dielectric Breakdown Voltage and Dielectric Strength of Insulating Gases at Commercial Power Frequencies (formerly D 2477 - 66 T) (Subcommittee N) (effective Nov. 14, 1969)
- D 1473 - 70**, Method of Test for 2,6-Di-tertiary-Butyl Para-Cresol in Electrical Insulating Oils (formerly D 1473 - 67 T) (Subcommittee O) (effective Jan. 22, 1970)
- D 2608 - 70**, Method of Test for Copper in Electrical Insulating Oils by Photometric Analysis (formerly D 2608 - 67 T) (Subcommittee O) (effective Jan. 22, 1970)
- D 2675 - 70**, Method of Test for Copper in Insulating Oils Spectrochemically by the Solution-Rotating Disk Method (formerly D 2675 - 67 T) (Subcommittee O) (effective Jan. 22, 1970)

Revision of Standards, Immediate Adoption:

- D 1040 - 69**, Standard Specification for Uninhibited Mineral Oil for Use in Transformers and in Oil Circuit Breakers (formerly D 1040 - 68) (Subcommittee A) (effective April 25, 1969)

The inclusion of the oxidation stability test, D 2440, which is somewhat similar to the European IEC test for oxidation stability, with limits for sludge formation makes this specification more suitable as an international standard.

- D 117 - 69**, Standard Method of Testing Electrical Insulating Oils (formerly D 117 - 68) (Subcommittee A) (effective Dec. 19, 1969)

Certain changes in the text referring to "oxidation stability" were in order, as one of the oxidation methods was deleted. The term "Specific Resistance" was used instead of "Resistivity." A general modernization of terms was installed.

- D 923 - 70**, Standard Methods of Sampling Electrical Insulating Liquids (formerly D 923 - 65) (Subcommittee P) (effective Feb. 27, 1970)

The revision will approve the use of this method for sampling askarels.

- D 2283 - 70a**, Standard Specification for Chlorinated Aromatic Hydrocarbons (Askarels) for Transformers (formerly D 2283 - 68) (Subcommittee B) (effective Feb. 27 and March 6, 1970)

Two separate revisions are involved. One incorporates a change in the definition of askarel to warn of a possible fire hazard. The second revision involves the addition of Types C and D to the specification.

- D 901 - 70**, Standard Methods for Testing Askarels (formerly D 901 - 69) (Subcommittee B) (effective March 9, 1970)

The revision incorporates a change in the definition of askarel to warn of a possible fire hazard.

- D 2233 - 70**, Standard Specification for Chlorinated Aromatic Hydrocarbons (Askarels) for Capacitors (formerly D 2233 - 68) (Subcommittee B) (effective March 6, 1970)

The revision incorporates a change in the definition of askarel to warn of a possible fire hazard.

These seven standards will appear in the 1970 Annual Book of ASTM Standards, Part 29.

REPORT OF COMMITTEE D-27

Reapproval of Standards:

Pursuant to the requirement of the Society that standard methods be reapproved after five years standing without revision, the following methods and specifications were recommended to the Society for reaffirmation as standards after an approval vote by letter ballot of Committee D-27. They have now been accepted by the Society and will appear in the 1970 *Annual Book of ASTM Standards*, Part 29, with the reapproval year 1969 in parentheses in the designation.

- D 94 - 62, Test for Saponification Number by the Color-Indicator Titration
- D 831 - 63, Test for Gas Content of Insulating Oils
- D 924 - 65, Test for Power Factor and Dielectric Constant of Electrical Insulating Liquids
- D 1169 - 64, Test for Specific Resistance (Resistivity) of Electrical Insulating Liquids
- D 1315 - 63, Test for Water in Insulating Oils by Extraction
- D 1533 - 61, Test for Water in Insulating Liquids (Karl Fischer Method)
- D 1563 - 60, Test for Peroxide Number of Mineral Insulating Oils
- D 1698 - 64, Test for Sediment and Soluble Sludge in Service-Aged Insulating Oils
- D 1807 - 64, Test for Refractive Index and Specific Optical Dispersion of Electrical Insulating Liquids
- D 1808 - 63, Test for Volume of Oil in Oil-Contaminated Askarels
- D 1810 - 63, Test for Specific Gravity of Askarels
- D 1818 - 63, Spec. for Continuity of Quality of Electrical Insulating Oil for Low-Pressure Cable Systems
- D 1821 - 63, Test for Inorganic Chlorides in Askarels
- D 1903 - 63, Test for Coefficient of Thermal Expansion of Electrical Insulating Liquids of Petroleum Origin, and Askarels
- D 1933 - 64, Spec. for Nitrogen Gas as an Electrical Insulating Material
- D 2129 - 64, Test for Color of Chlorinated Aromatic Hydrocarbons (Askarels)

ACTIVITIES OF SUBCOMMITTEES

Materials Subcommittee A on Mineral Oils (C. E. Trautman, chairman), has been

concerned with the causes of transformer failures, and with the idea that a thorough exploration of these causes will result in decreasing costly breakdowns. New sections have been established to study the phenomenon of corona and its meaning as referred to loss of power. Another section is discussing methods to predict lack of compatibility between oil and materials of construction. A third group is gathering information on the effect of d-c voltage on oils and materials, and whether the environmental conditions of air, dust, pollutants, and moisture may be the combining catalyst in promoting deterioration.

Impulse testing has passed the discussion stage and a group is gathering data on the meaning of the results from as yet unpublished methods.

Section I on Survey under C. E. Trautman has modernized Method D 117, Testing Electrical Insulating Oils, making changes in the text to make the statements on Significance agree with those in the methods cited. New methods have been added to D 117 as they are approved as standards, and revisions of existing standards are reflected in the altered text of D 117.

Section II on Transformer Oils under R. L. Peeler has prepared a proposed specification for an inhibited insulating oil for committee consideration.

Section IV on Corona Phenomena under E. Simo has collected ideas and methods for estimating corona, its source, cause, and effects, and will try to incorporate the various suggestions in a test procedure for trial.

Section V on Effects of D-C Voltage on Insulating Oil under E. L. Morrison has heard numerous ideas and opinions on this subject. The general information gathered has not lead to any consensus on the drafting of a test procedure.

Section VI on the Effect of Metals on Oil under J. H. Orum was overwhelmed with suggestions and test procedures from various sources. It was found that Committee D-9 was also interested in this problem, and might take an active part in aiding in the preparation of aging studies.

Subcommittee A has also made changes in Specification D 1040, for Uninhibited Insulating Oil for Use in Transformers and Oil Circuit Breakers, adding a test limit for oxi-

REPORT ON COMMITTEE D-27

dation stability which makes this specification more realistic. It has improved the text and added to the subject matter in Method D 117, making this compilation more up to date. Specification D 1818, for Continuity of Quality of Electrical Insulating Oil for Low-Pressure Cable Systems, has been reapproved as a standard.

Materials Subcommittee B on Synthetics (R. M. Frey, chairman), has revised the definition for askarels appearing in Methods D 901, for Testing Askarels, Specification D 2233, for Askarels for Capacitors, and Specification D 2283, for Askarels for Transformers. The new definition states that askarels of various compositional types are used. Under arcing conditions, the gases produced, while consisting predominantly of non-combustible hydrogen chloride, can yield varying amounts of combustible gases depending upon the askarel type. Insulating systems incorporating these askarels and cellulosic or other organic materials, may, when arced, produce gaseous mixtures that are moderately flammable. Two additional types of askarels for transformers have been recommended in Specification D 2283. Several standard methods pertaining to askarels have been reapproved as standards in accordance with the five-year rule of the Society: D 1808, D 1810, D 1821, D 1903, and D 2129. Methods D 923 on Sampling are now applicable to askarels. Two of the askarel methods have been recommended as ANSI standards (D 2225 and D 2223). Editorial changes in Methods D 2225 and D 2522 have been accepted by the Society.

Section II on Askarels under P. G. Benignus has a study of the compatibility of askarels on materials of construction under way. The possibility of solution of these materials in askarels as contaminants may become another area of investigation.

Materials Subcommittee C on Gases (C. E. Welsh, chairman), believes that irradiation of gases should become part of the test procedure for dielectric breakdown of gases (Method D 2477). The reduction of the dew-point requirement of sulfur hexafluoride (Specification D 2472) will reduce the moisture content of this gaseous insulant by one half without creating a hardship to manufacturers. This specification has now been adopted as standard, and the Specification

for Nitrogen (D 1933) has been reapproved as a standard.

Subcommittee D on Nomenclature and Definitions of Terms (R. E. Savoie, chairman), has gained approval on nine definitions which have been accepted by the Society as D 2864, Definitions of Terms Relating to Electrical Insulating Liquids and Gases. This will be a continuing task to add other definitions as they become acceptable to the committee. Comparison with the definitions accepted by Committee D-9 should prevent any duplication of items.

Methods Subcommittee N on Electrical Tests (F. D. Walker, chairman), has recommended two tentative methods for adoption as standard, which have been accepted by the Society: D 2413 on testing of oil-impregnated paper and D 2477 on the breakdown voltage of gases. Two standard methods were reapproved as standards, D 924 and D 1169, in compliance with the five-year rule of the Society. Two methods were recommended for consideration as ANSI Standards: D 1934 on Oxidation Aging and D 2298 on Stability under Electrical Stress.

Section I on Power Factor under R. I. Lowe has reported that standard samples are now available from the National Bureau of Standards.

Section IV on Oil-Impregnated Paper has voted to adopt D 2413 as standard and will now consider revisions approved by Committee D-9. The Liaison Group of D-9/D-27 has made the consideration of these changes less complex.

Section VI on Breakdown Voltage of Gases under H. G. Erdman has discontinued the study of the Seavey cell, and will require a steady source of irradiation in tests using Method D 2477.

Section VIII on Impulse Testing under H. G. Erdman has held its initial meeting. A great deal of interest has been generated as well as many diverse opinions on this subject. Methods in private use are being examined, and several criteria of tests are being assembled. There is some dissent on the meaning of the results.

Methods Subcommittee O on Chemical Tests (V. R. Mulhall, chairman), is continuing the Task Force which is endeavoring to make the test for oxidation characteristics (old D 1904) more reproducible. A second

REPORT OF COMMITTEE D-27

Task Force on Method D 2440 has provided acceptable limits by the method for inclusion in Specification D 1040. Editorial changes in Method D 1313 on Bomb Sludge, and in Method D 2440 on Oxidation Stability have been accepted by the Society. An addition to Methods D 1701 on Scavengers has been accepted also.

The subcommittee recommended eight methods for acceptance as ANSI Standards, and has recommended reapproval of four of its methods as standards. Three tentative methods were adopted by the Society as standards.

Methods Subcommittee P on Physical Tests (H. W. McCulloch, Jr., chairman), has reapproved eight of its standard methods as required by the Society. Method D 923 on Sampling has been revised. Fourteen methods have been recommended for consideration as ANSI Standards.

Section I on Sampling under C. R. Johnson is working on a special container for gaseous material. This sampling has been a troublesome problem.

Section III on Gas Content under L. B. Baranowski has a new method ready for subcommittee letter ballot.

Section IV on Moisture by Extraction under J. H. Orum is solving a difficult problem in the development of a method to determine free water in insulating paper. A combination of the methods of several companies has been assembled and the results are promising.

Section IX on Infrared Absorption under R. H. Kershaw is applying this technique to

the detection of oil in oil-contaminated askarels. The steps in this method may be easier than the procedure in D 1808.

Section XVI on Combustible Gases and Nitrogen Over Oil under E. L. Morrison will work closely with Section XVIII on Analysis of Gases. There was agreement that the composition of the gases was next in importance after the capture of the gas sample.

Subcommittee Z on Symposia (R. L. Peeler, chairman), has presented two panel discussions during the year with excellent attendances. In March 1969, Dr. Munch of the Monsanto Co. discussed the power factor changes in askarels, illustrated with color slides and explanatory graphs.

A second panel meeting in October was on the subject of compatibility of oils and solid materials. Apparatus technicians deftly handled the probing questions coming from an attentive audience. The success of these meetings is greatly enhanced by audience participation. The March 1970 session promises a presentation of infrared techniques and capabilities.

This report has been submitted to letter ballot of the committee, which consists of 76 voting members; 62 members returned their ballots, of whom 60 voted affirmatively, 0 negatively, and 2 did not vote.

Respectfully submitted upon the behalf of the committee,

E. L. RAAB,
Chairman

C. A. JOHNSON,
Recording Secretary

REPORT OF COMMITTEE D-28 ON ACTIVATED CARBON

Committee D-28 on Activated Carbon held one meeting during the year at Philadelphia, Pa., on May 26 and 27, 1970. In addition, subcommittee .02 met on April 17, 1970 in Philadelphia, Pa., and Subcommittee .04 met on Oct. 14 and 15, 1969 in Oak Ridge, Tenn., and on June 14 and 15, 1970, in Richmond, Va.

The officers elected for the ensuing term of two years are as follows:

Chairman, B. M. Winner
Vice-Chairman, G. H. Scheffler
Secretary, W. M. Holt, Jr. (pro tem)

The committee consists of 22 voting members of whom 11 are classified as producers and 11 as consumer members.

J. L. Kovach and A. W. Loven were elected members-at-large of the Executive Subcommittee.

The committee is considering the establishment of an E. P. Barret Award for the recognition of outstanding work in the field of activated carbon.

The committee notes with regret the resignation of E. T. Ellis and D. G. Hannan, who have contributed much to the work of the committee.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee D-28 submitted the following recommendation to the Society for action under the Interim Procedure for Standards, which were accepted by the Society on the dates indicated:

New Standards:

D 2854 - 70, Test for Apparent Density of Activated Carbon (Subcommittee IV) (effective Feb. 27, 1970)

D 2862 - 70, Tests for Particle Size Distri-

bution of Granular Activated Carbon (Subcommittee IV) (effective April 13, 1970)

D 2866 - 70, Test for Ash Content of Activated Carbon (Subcommittee IV) (effective May 29, 1970)

D 2867 - 70, Test for Moisture in Activated Carbon (Subcommittee IV) (effective May 29, 1970)

Adoption of Tentative as Standard Without Revision:

D 2355 - 70 (formerly D 2355 - 65 T), General Recommended Practice for Liquid Phase Evaluation of Activated Carbon (Subcommittee IV) (effective March 19, 1970)

ACTIVITIES OF SUBCOMMITTEES

Subcommittee D28.02 on Liquid Phase Evaluation Tests (R. S. Joyce, chairman) has developed a test procedure for pH and water extractables, which will be submitted to subcommittee ballot shortly. A task group is to be formed for the purpose of reviewing existing procedures for determination of iodine number. One procedure will be recommended for evaluation.

Current plans include a meeting with the Analytical Methods Committee of the Corn Industries Research Foundation to discuss the possibility of a joint effort for the evaluation of carbon for corn refining.

During the year, the subcommittee sponsored informal talks by A. N. Masse of the Federal Water Quality Agency, and Richard Keller of Dow Chemical Co. on the subject of Municipal and Industrial Waste Water Treatment.

Subcommittee D28.03 on Nomenclature and Editorial (F. R. Schwartz, chairman) completed work on eleven new definitions which were successfully balloted by the sub-

REPORT OF COMMITTEE D-28

committee and committee, and submitted for adoption by the Society. Forty-one additional definitions are being prepared for Subcommittee ballot, leaving a final group of twenty-five terms for future review.

Subcommittee D28.04 on Gas Phase Evaluation (D. G. Hannan, chairman) obtained Society approval for the new test methods listed above. Methods of test for activity-retentivity, and ignition temperature are near completion. The subcommittee will meet next in Toronto, Canada, on July 27 and 28, 1970.

Following Mr. Hannan's resignation and

nomination by the subcommittee, W. M. Holt, Jr., was appointed to succeed D. G. Hannan as chairman of Subcommittee D28.04.

The next meeting of the full D-28 committee is scheduled for June 27 and 28, 1971, in Atlantic City, N. J.

Respectfully submitted on behalf of the committee,

B. M. WINNER,
Chairman

E. T. ELLIS,
Secretary

REPORT OF COMMITTEE

D-29 ON PEAT, MOSSES, HUMUS, AND RELATED PRODUCTS

ASTM Committee D-29 on Peats, Mosses, Humus, and Related Products and its Executive Committee met in New York, N.Y., on June 16 and 17, 1970. The Executive Committee also met on Jan. 17, 1970, in Washington, D.C.

The committee is now composed of 44 voting members and 13 consultants. The voting members are classified as follows: 19 producers, 3 consumers, and 22 general interest.

Two ad hoc committees have been formed; Consumer Education, chaired by J. K. Chapin, Jr., and Publicity, chaired by J. A. Hartman.

During January 1970, Albert Sundgren of the State Institute for Technical Research, Helsinki, Finland, passed away. Professor Sundgren was instrumental in organizing the International Peat Society and was its first president.

By letter ballot dated April 21, 1970, the following officers and Executive Committee members were elected for the ensuing two-year term:

Chairman, W. S. Rodney
1st Vice-Chairman, Peter Ellis
2nd Vice-Chairman, John Dunfield
Secretary, David Dennison
Chairman, Subcommittee I, R. S. Farnham
Chairman, Subcommittee II, Virginia Thorpe
Chairman, Subcommittee III, R. Stanley Dyal

Chairman, Subcommittee IV, Ernst Mayer
Members at Large—Myron Anderson, Herve Fafard, J. A. Hartman, Robert Render, and Theodore Tibbetts

ACTIVITIES OF SUBCOMMITTEES

Subcommittee I on Definitions and Nomenclature (R. S. Farnham, chairman) has made some progress on the preparation of a bibliography of peat.

Subcommittee II on Methods of Sampling and Testing (Miss Virginia Thorpe, chairman) has prepared a new method for volume, weight, and water holding capacity. The method is now being subjected to tests. Efforts are continuing to reconcile the negative votes on the draft test procedures.

Subcommittee IV on International Liaison (Ernst Mayer, chairman) has been active in assisting the chairman of Committee D-29 in organizing a U.S. National Committee of the International Peat Society (USNC-IPS). An organizing committee meeting was held in New York, N.Y. on June 17, 1970. A committee of five will be appointed to write the bylaws. It is hoped that this work will be completed and the USNC-IPS recognized by the IPS.

Respectfully submitted on behalf of the committee,

W. S. RODNEY,
Chairman

DAVID DENNISON,
Secretary

REPORT OF COMMITTEE

D-30 ON HIGH-MODULUS FIBERS AND THEIR COMPOSITES

Committee D-30 on High-Modulus Fibers and Their Composites held two meetings during the year: on October 27 and 28, 1969, in Detroit, Mich., and on March 2 and 3, 1970, in Cincinnati, Ohio, and on June 1 and 2, 1970, in Philadelphia, Pa.

The committee consists of 211 members, 137 voting members, of whom 30 are classified as producers, 22 as producers and consumers, 39 as consumers and 46 as general interest members.

The following committee officers were elected to serve for a two-year term beginning after the 1970 Annual Meeting.

Chairman, M. J. Salkind

Vice-Chairman, W. H. Drescher

Secretary, W. D. Freeston, Jr.

Membership Secretary, R. C. Young

Members-at-Large of the Executive Committee, J. W. Axelson and J. W. Moore

Dr. P. D. Gorsuch has been awarded a 1970 Society Award of Merit for his contributions to Committee D-30 during its critical formative years. He served as Chairman of the Committee during its first four years of existence.

A Seminar on Nondestructive Testing of Fibers and Fibrous Composites was held on October 28, 1969 at Detroit in conjunction with the Committee meeting.

A National Symposium on High Performance Fibers—Properties, Applications and Test Methods is being sponsored by the Committee for November 17 and 18, 1970, Williamsburg, Va.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR COMMITTEE STANDARDS

Subsequent to the 1969 annual report, Committee D-30 submitted the following recommendations to the Society for action

under the Interim Procedure for Standards, which became effective on the dates indicated:

Adoption of Tentatives as Standard Without Revision:

D 2589 - 70 (formerly D 2589 - 67 T), Bauer-McNett Wet Classification of Asbestos Fiber (Subcommittee III) (effective May 29, 1970)

D 2590 - 70 (formerly D 2590 - 67 T), Sampling of Asbestos Fiber for Testing (Subcommittee III) (effective May 29, 1970)

Adoption of Tentative as Standard With Revision:

D 2290 - 69 (formerly D 2290 - 64 T), Apparent Tensile Strength of Parallel Reinforced Plastics by Split Disk Method (Subcommittee V) (effective Nov. 14, 1969)

Recommended to fill the pressing needs of the producing and consuming industries for standard methods for evaluating asbestos fiber and fiber reinforced plastics.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee D 30.01 on Editorial, Definitions, and Specifications (R. J. Diefendorf, chairman) has been active in three areas. The first has been the editorial review of Tentative Methods of Testing and Definitions. This review is made to determine internal logical consistency, clarity, and adherence to the ASTM format. The second area is the development of standard verbal and mathematical nomenclature. The conflicts in symbols used for mathematics are probably the most numerous with as many as six symbols applying to one term. In the coming year, a listing of all terms and symbols will be made with the entries under

REPORT OF COMMITTEE D-30

a particular heading listed in order of preference. The third area has been the recommendation of the use of standard data formats. In the past, data has often been of little value, because important test parameters have not been recorded. In the coming year, standard data formats will be prepared.

Subcommittee D 30.02 on Research and Mechanics (S. Yurenka, chairman) is continuing to stimulate research and disseminate technical knowledge on the behavior of fibers and their composites by planning symposia and organizing lectures. The second semi-annual symposium on "Composite Materials: Design and Testing" will be held in Anaheim, Calif. on April 20-22, 1971. A section D 30.02.01 on Technical Symposia (G. C. Grimes, chairman) was appointed to assist the Symposium Chairman, Dr. H. T. Corten, in planning the program and in establishing similar future symposia. The 1971 symposium will be co-sponsored by AIME and is being held back-to-back with the symposia of two other societies, that is SAMPE and AIAA-ASME. If this liaison proves to be successful, similar unions may be sought for the 1973 and 1975 symposia.

In response to a request from S. Prosen, Chairman of Subcommittee D 30.05 on Organic Matrix Composites, to investigate the mechanical aspects of the short beam shear test, Dr. J. M. Whitney lectured at the October 1969 meeting on some of his recent theoretical work along these lines at the Air Force Materials Laboratory. At the following meeting on March 1970, Dr. E. Wu gave a lecture on "Problems Associated with Testing Cylindrical Specimens." Such lectures have proved to be very informative and popular and will be given whenever possible, in conjunction with future meetings of the committee.

To encourage research in the mechanics of composites a section D 30.02.02 (Dr. J. M. Whitney, chairman) was formed. One of the first areas which will be considered by this new section will be the experimental aspects of micromechanical research with a particular emphasis on the instrumentation being used to measure stresses and strains.

Subcommittee D 30.03 on Asbestos and Naturally Occurring Fibers (M. Cosette, chairman) is revising Tentative Method D 2752 - 68 T on Air Permeability of Asbestos

Fibers prior to submitting to ballot for elevation to a full standard.

Definitions relating to asbestos methods for Ro-Tap analysis, color measurement and determination of moisture, were advanced to various stages of the adoption process. A new Task Group on Viscosity was formed. A Research Group on the Crude Content of Asbestos was organized. A joint meeting was held on 17 July 1969 with the QAMA (Quebec Asbestos Mining Association) Subcommittee on Wet Classification. Azeotropic distillation is being studied by the Moisture Task Group. Liaison with the Magnetic Rating Task Group 4 of Section A of ASTM Committee D-13 was maintained.

A paper on "An Interdisciplinary Approach to Wet Classification" by A. A. Winer was presented at the October 28, 1969 meeting and a paper on "The Fibrator Test" by J. W. Axelson at the March 3, 1970 meeting.

Subcommittee D 30.04 on High Modulus Fibers (S. Schulman, chairman) has been reorganized as follows: D 30.04.01—Specifications, D 30.04.02—Fiber Analysis, D 30.04.03—Strand Analysis, and D 30.04.04—Whiskers.

The "Guide for Reporting Tensile Test Results" has been finalized and will be recommended as a standard. This will eliminate confusion in the area of data analysis, and enable research people to use a guide for uniform reporting of data.

Two specifications are being drafted: (a) Test Method for Flexible Reinforcing Fibers (that is, boron carbide, carbon, graphite, etc.) (b) Test Method for Rigid Reinforcing Fibers (boron, silicon carbide etc.).

A study has been initiated to eliminate some of the tedious single fiber testing presently being used to evaluate high modulus yarns. This testing is both time consuming and costly. The study involves a "round-robin" of strand testing and the resulting analysis. A draft has been prepared outlining a guide for sample preparation.

Subcommittee D 30.05 on Organic Matrix Oriented Fibrous Composites (S. Prosen, chairman)—The scope of the subcommittee was finalized as follows: Responsible for development of test methods, recommended practices, specifications, nomenclature, classification, stimulation of research, and in-

REPORT OF COMMITTEE D-30

vestigation of specialized fibrous composites which have organic matrices and which are reinforced with oriented fibers, or where the reinforcement action is accomplished mainly by oriented fibers.

Oriented fibers herein include yarn, roving, loom warps, parallel fibrous mat, parallel fibrous tape, cloth, or other similar construction. The oriented construction can be made up of either continuous filaments or short length fibers, including whiskers, as long as they are oriented in any of the manners described above, or if they are oriented in the process of building specimens, structures or components.

During this period, the following task groups were instituted and are now active: (1) tensile test methods, (2) compression test methods, (3) strand tensile test method (4) shear tests (5) fiber volume, and (6) definitions.

The following test methods are being made ready by Subcommittee D 30.05 for ballot: torsion shear test method resin content determination in boron—resin composites short-beam shear method, resin content method, and tensile method for continuous and discontinuous composites.

Methods being investigated by task groups of Subcommittee D 30.05 are: compression

test method, void content determinations, strand tensile test, and specifications.

Subcommittee D 30.06 on Inorganic Matrix Composites (E. N. Lenoe, chairman)

—Letter ballots were sent out on three test methods: tension testing of continuous fiber reinforced composites; tension testing of discontinuous fiber reinforced composites; flexure testing. The results of the balloting and associated commentary were reviewed and incorporated into revised tentative test methods which have been submitted for balloting at the committee level.

With regard to the overall level of activities, Subcommittee D 30.06 has diminished considerably in active membership participation and this appears to be a reflection of the relative inactivity in metal matrix composites research and development. While the filamentary metal matrix activities have diminished, increasing interest has been displayed in the reinforced bulk graphite and laminated metal composites.

The area of torsion and shear testing of inorganic composites has been reactivated.

Respectfully submitted on behalf of the committee,

MICHAEL J. SALKIND,
Chairman

W. D. FREESTON, JR.,
Secretary

REPORT OF COMMITTEE E-1 ON METHODS OF TESTING

Committee E-1 on Methods of Testing held meetings on Nov. 20, 1969, at ASTM Headquarters in Philadelphia, Pa., and on April 7, 1970, at the Bell Telephone Laboratories in Murray Hill, N. J. Meetings of E-1 subcommittees were held at the June 1969 Annual Meeting of the Society in Atlantic City, N. J., and at other times and places.

On Oct. 22, 1969, Committee E-29 on Particle Size Measurement was organized and the former E-1 Subcommittees 10 and 11 were incorporated into this committee. On Nov. 21, 1969, Committee E-28 on Mechanical Testing was organized and the former E-1 Subcommittees 1, 3, 4, 5, 6, 7, 8, 25, 30, and 33 were incorporated into this committee. Responsibility for hydrogen ion determinations was transferred to Committee E-15 on Analysis and Testing of Industrial Chemicals and the E-1 Subcommittee 22 was discontinued.

The following officers have been elected for the two-year term from June, 1970 to June, 1972:

Chairman, R. D. Thompson

Vice-Chairman, Tinius Olson, II

On April 20 and 21, 1970, the E-1 Provisional Subcommittee on Thermoanalytic Test Methods sponsored, with the cooperation of the National Bureau of Standards, a Symposium at National Bureau of Standards on Current Status of Thermal Analysis. A Symposium on Stress Relaxation Testing and Its Applications was organized by the former E-1 Subcommittee 33 and presented at the 1970 Annual Meeting under the sponsorship of that subcommittee, reconstituted as Subcommittee 11 of Committee of E-28.

RECOMMENDATIONS ACCEPTED BY THE COMMITTEE ON STANDARDS

Subsequent to the 1969 annual report, Committee E-1 presented to the Society through the Committee on Standards the

following recommendations, which were accepted effective on the dates indicated:

New Tentative:

E 392 - 69 T, Recommended Practice for Equipment for Conditioned Atmospheres: Temperature and Relative Humidity (Subcommittee 14) (effective Nov. 7, 1969)

This recommended practice seeks to fill the need for uniform requirements for equipment for obtaining conditioned atmospheres, particularly as required in standard methods of test.

The new tentative appears in the 1970 *Annual Book of ASTM Standards*, Part 30.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee E-1 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which were accepted by the Society effective on the dates indicated:

New Standard:

E 398 - 70, Recommended Practice for Dynamic Measurement of Water Vapor Transfer (Subcommittee 14) (effective May 29, 1970)

This recommended practice covers the procedures by which a dynamic evaluation may be made of the rate of transfer of water vapor through a barrier material and converted to the generally recognized units of WVT as obtained by the standard gravimetric method given in ASTM Method E 96, Test for Water Vapor Transmission of Material in Sheet Form.

Adoption of Tentative as Standard Without Revision:

E 12 - 70 (formerly E 12 - 61 T), Definitions

REPORT OF COMMITTEE E-1

of Terms Relating to Density and Specific Gravity of Solids, Liquids, and Gases (Subcommittee 12) (effective May 29, 1970)

E 289 - 70 (formerly E 289 - 65 T), Test for Linear Thermal Expansion of Rigid Solids with Interferometry (Task Group B) (effective May 29, 1970)

Adoption of Tentative as Standard with Revision:

E 229 - 70 (formerly E 229 - 63 T), Test for Shear Strength and Shear Modulus of Structural Adhesives (Subcommittee 25) (effective May 29, 1970)

This method was revised to bring it up to date with current practices.

E 345 - 70 (formerly E 345 - 68 T), Methods of Tension Testing of Metallic Foil (Subcommittee 4) (effective Nov. 14, 1969)

These methods were revised to include the need for special grips for some high-strength thin materials.

Revisions of Standards:

E 8 - 70 (formerly E 8 - 68), Methods of Tension Testing of Metallic Materials (Subcommittee 4) (effective Nov. 14, 1969)

These methods were revised so that the accuracy of dimension measuring devices are greater than previously specified.

E 9 - 70 (formerly E 9 - 67), Compression Testing of Metallic Materials at Room Temperature (Subcommittee 5) (effective June 18, 1970)

Method E 9 was revised to include an appendix.

E 11 - 70 (formerly E 11 - 61) Specifications for Wire-Cloth Sieves for Testing Purposes (Subcommittee 1) (effective May 29, 1970)

This specification was revised to indicate equivalency with the ISO Recommendations for sieve openings.

E 161 - 70 (formerly E 161 - 68), Specification for Precision Electroformed Sieves (Subcommittee 10) (effective May 29, 1970)

This specification was revised to adjust the

nominal apertures to conform with the ISO specifications.

E 323 - 70 (formerly E 323 - 67), Specification for Perforated-Plate Sieves for Testing Purposes (Subcommittee 10) (effective May 29, 1970)

This specification was revised to adjust the nominal apertures to conform with the ISO specifications.

Reapproval of Standards:

E 123 - 64 (1970), Specification for Apparatus for Determination of Water by Distillation

E 124 - 61 (1970), Specification for Weighing and Drying Apparatus for Microchemical Analysis

E 128 - 61 (1969), Test for Maximum Pore Diameter and Permeability of Rigid Porous Filters for Laboratory Use

E 144 - 64 (1970), Recommended Practice for Safe Use of Oxygen Combustion Bombs

E 147 - 61 (1970), Specifications for Apparatus for Microdetermination of Nitrogen by the Kjeldahl Method

E 148 - 66 (1970), Apparatus for Microdetermination of Nitrogen by the Duman Method

E 191 - 64 (1970), Specification for Apparatus for Microdetermination of Carbon and Hydrocarbon in Organic and Organo-Metallic Compounds

E 193 - 64 (1970), Specifications for Micro-pipets

E 205 - 64 (1970), Specifications for Oxygen Combustion Flask

Standards E 345, E 8, and E 9 appear in the 1970 *Annual Book of ASTM Standards*, Part 31. The remaining standards appear in the 1970 edition of Part 30.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee 12, Methods for Density (L. B. McCurdy, chairman) is attempting to resolve persistent differences of opinion concerning the various terms relating to density in Definitions E 12, Terms Relating to Density and Specific Gravity of Solids, Liquids, and Gases.

Subcommittee 34, Machinability Test Methods (C. A. Divine, chairman) has com-

REPORT OF COMMITTEE E-1

pleted a detailed investigation and appraisal of test methods used on automatic screw machines for the machinability of metals.

Provisional Subcommittee on Thermo-analytical Test Methods (A. F. Findeis, chairman) is considering various thermal analysis definitions from the International Committee on Thermal Analysis for possible acceptance as ASTM definitions and will attempt to begin writing general methods and recommended practices relating to thermal analysis.

Task Group B, Linear Thermal Expansion

Test (R. K. Kirby, chairman) is continuing efforts to reach an agreement on a revision of Methods E 228, Test for Linear Thermal Expansion of Rigid Solids with a Vitreous Silica Dilatometer, to specify apparatus requirements for two levels of accuracy.

Respectfully submitted on behalf of the committee,

R. D. THOMPSON,
Chairman

M. D. HUBER,
Secretary

REPORT OF COMMITTEE E-2 ON EMISSION SPECTROSCOPY

Committee E-2 on Emission Spectroscopy and its subcommittees held two meetings during the past year: on June 24 to 27, 1969, in Atlantic City, N. J., and on March 3 to 6, 1970, in Cleveland, Ohio. In addition, the Executive Committee met in Philadelphia, Pa. on Oct. 17, 1969.

The committee consists of 212 voting members, none of whom are classified. The committee regrets to report the deaths of three of its members: William Poehlman, Raymond G. Russell, and Alan Goldblatt.

The membership approved a revision of the bylaws.

The officers elected for the ensuing term of two years are as follows:

Chairman, D. C. Spindler

Vice-Chairman, W. R. Kennedy

Secretary, Sarah H. Degenkolb

D. J. Ward was appointed membership secretary.

In 1969 a new committee award, the H. V. Churchill Award, was inaugurated for meritorious service to the committee. J. R. Churchill was the first recipient. The 1970 recipient was Morris Slavin. New honorary Committee E-2 members are D. F. Nisbet, J. F. Murphy, and Sam Vigo.

A. I. Gordon has chaired a Coordination Committee on Atomic Absorption. This committee met in June and March to coordinate the assignments in Subcommittees 1, 2, and 3 on atomic absorption, in an effort to hasten progress and to be responsive to the needs of other ASTM committees. The assignments are (1) a specification for spectrometers (Subcommittee 1), (2) a practice for atomic absorption (Subcommittee 2), and (3) nomenclature and style guide (Subcommittee 3).

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report,

Committee E-2 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which were accepted by the Society effective on the dates indicated:

New Standards:

E 401-70, Recommended Practice for Bonding Thin Spectrochemical Samples and Standards to a Greater Mass of Material (Subcommittee 4) (effective July 15, 1970)

This new practice is needed for the economical use and conservation of standard reference materials and for thin samples.

E 402-70, Method for the Spectrochemical Analysis of Uranium Oxide by Gallium Oxide Carrier D-C Arc Technique (Subcommittee 6) (Oct. 2, 1970)

This method has been cooperatively tested and found satisfactory for the analysis of uranium oxide.

E 403-70, Method for Spectrochemical Analysis of Plain-Carbon and Low-Alloy Steel by the Point-to-Plane Technique Using an Optical Emission Spectrometer (Subcommittee 9) (Aug. 14, 1970)

The method had been published as Suggested Method E-2 SM 9-29. It has been cooperatively tested and found satisfactory for adoption as standard.

E 404-70, Method for Spectrochemical Analysis of Plain Carbon and Low-Alloy Steel for Boron by the Point-to-Plane Arc Technique (Subcommittee 9) (Aug. 14, 1970)

The method had been published as Suggested Method E-2 SM 9-4. It has been cooperatively tested and found satisfactory for adoption as standard.

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Revision of Standard:

E 116-70 (formerly E 116-67), Recommended Practice for Photographic Photometry in Spectrochemical Analysis (Subcommittee 2) (effective March 19, 1970)

The present standard is a thoroughly reviewed and revised replacement of E 116-67. It is an important reference for all E-2 photographic methods.

AMERICAN NATIONAL STANDARDS

Results of the committee ballot on six methods and practices recommending adoption as American National Standards were submitted to ASTM on Oct. 23, 1969.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee 1 on Description and Performance Specifications of Equipment (J. D. Nohe, chairman)—Three practices have been approved by the subcommittee as follows: Recommended Practices for the Planning and Safe Operation of a Spectrochemical Laboratory (J. F. Woodruff and D. C. Spindler); Proposed Recommended Practices for Grounding Basic Optical Emission Spectrochemical Equipment (J. F. Woodruff); and Recommended Practice for Description and Performance of the Microphotometer. The latter practice has been balloted on by Committee E-2 and the negative results are being resolved. There are three task group assignments: J. Schuch is developing a description of suitable optical emission spectrometers to be incorporated into Recommended Practices E 356-68, Describing and Specifying the Spectrograph; V. G. Mossotti has prepared a second draft of a practice for specifying atomic absorption spectrometers; and Ellen Proctor is preparing a first draft of a practice on X-ray spectrometers.

Subcommittee 2 on Fundamental Practices (R. E. Heffelfinger, chairman)—The emphasis has been on providing a Recommended Practice for Atomic Absorption Spectrometry. A task group under S. B. Smith has prepared sections of the practice, which have been condensed and roughly put into ASTM style. The practice should be ready for subcommittee ballot shortly. The suggested practice on flame spectrometry is being rewritten by B. Buell and J. Ramirez-Muñoz. The subcommittee is currently bal-

lotting on minor revisions in Recommended Practices E 115-67, Photographic Processing in Spectrochemical Analysis. Other current projects are the promotion of the "Guidelines for Interlaboratory Tests" prepared by W. R. Kennedy, possible promotion of Suggested Practice SM 2-4, Use of Statistical Methods in Spectrochemical Analysis, a possible practice on X-ray fluorescence, and a symposium on fundamentals to be held in 1971 or 1972.

Subcommittee 3, Editorial (A. I. Gordon, chairman)—In anticipation of the publication of a new edition of "Methods for Emission Spectrochemical Analysis" 29 methods were reviewed and accepted editorially. Eleven methods are currently being reviewed. The task of reviewing all this material has been a notable accomplishment.

The Style Guide on Atomic Absorption was written by A. Gordon and D. Spindler and distributed at the March Executive Meeting. It is planned to include this guide in the new book instead of the present one on optical emission methods.

The Nomenclature Task Group held two meetings. Under the chairmanship of C. H. North, an attempt was made to approve some atomic absorption terms and definitions by a task group ballot consisting of 71 terms. Based on the task group written ballot and a subsequent task group meeting, a subcommittee ballot is being prepared on selected terms.

On June 25, 1969, at Atlantic City, N. J., C. H. North held a task group meeting to define "sensitivity" and "detection limit." J. H. Kelly presented a report commenting on Skogerboe and Grant's material (Feb. 19, 1969) which proposed his own definitions of the terms. He pointed out the need for another term, such as "detectability."

J. F. Woodruff, chairman of the Publications Task Group in charge of publishing the new book, has informed all committee chairmen of their responsibilities in determining which methods in their area to delete and which to include. He and Al Gordon met with the ASTM staff in Philadelphia in April 1970 to plan the publication.

Subcommittee 4 on Electrodes, Pure Materials, Reagents and Standards (H. A. Johnson, chairman)—Under R. E. Michaelis' direction, a revision of the *ASTM DS2, Report on*

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Available Standard Samples, Reference Materials, and High Purity Materials for Spectrochemical Analysis, is nearing completion. An important contribution to the committee is the announcement in this subcommittee of new standard reference materials. Other programs were reported in the previous annual report.

Subcommittee 5 on Copper, Nickel, and High-Temperature Alloys (D. E. Brown, chairman) has 64 members. R. I. Quigley has been appointed vice-chairman and continues as subcommittee editor. W. H. Dingeldein has been appointed second vice-chairman, serving as secretary and membership chairman.

A suspension sheet system has been employed to improve communications within the Subcommittee Executive Group. This permits interim action for difficulties that arise between meetings.

Section activities are as follows:

Section 01 on Copper and Its Alloys (A. A. DiLeonardi, chairman):

(1) Copper (T. P. Sheehy, leader)—Testing has been completed on the Suggested Method for the Determination of Impurities in Copper by a Briquet-D-C Arc Technique. Based on this, a standard method with reduced scope has been written and submitted for editorial review.

(2) 70/30 Copper Nickel (J. H. Allwein, leader)—The suggested X-ray method for the determination of nickel, manganese, and iron has received editorial approval. Samples and standards have been collected to test the method.

(3) Round-robin tests continue for cartridge brass (Shirley Glessner, leader) and admiralty metal (H. R. Beck, leader). Both are nearing completion.

(4) A suggested method for the determination of impurities in copper by an oxidized-globular d-c arc method has been prepared in ASTM form and submitted for editorial review.

Section 02 on Nickel (W. L. Ott, chairman):

(1) *Standard Nickel Oxide Method* (E 129-61) (J. P. Kapetan, leader)—The interlaboratory test to revise and upgrade this method is at the halfway mark and additional cooperation is needed.

Section 03 on Nickel and High Temperature Alloys (M. A. Harrington, chairman):

(1) *Alloy 718*—Cooperative work on the X-ray method has been completed. Statistical evaluation and final rewrite of the method is in progress.

(2) *Tramps in High Temperature Alloys* (G. S. Golden, chairman)—This newly organized task group met on March 5, 1970, to plan tests. A silver chloride-lithium fluoride carrier d-c arc method has been prepared as a proposed standard and submitted for editorial review. Plans for testing the method further were developed.

Section 04 on Glass to Metal Sealing Alloy (W. B. Detmering, chairman)—A new task group has been formed to provide methods for this type of alloy. Initially, cobalt-nickel-iron types are to be tested.

Subcommittee 6 on Lead, Tin, Zinc, Indium, Gallium, and Related Metals (A. J. Lincoln, chairman) reapproved the following two standard methods: E 27-64, Standard Method for Spectrochemical Analysis of Zinc-Base Alloys and High Grade Zinc by the Solution Residue D-C Arc Technique, and E 117-64, Standard Methods for Spectrochemical Analysis of Pig Lead by the Point-to-Point Spark Technique. These methods were voted on by Committee E-2 and the results are being tabulated.

The following methods have been approved for publication as suggested methods:

Suggested Method for Spectrochemical Analysis of Prime Western Zinc Using an X-ray Spectrometer (T. P. Sheehy).

Suggested Method for Spectrochemical Analysis of Gold-Phosphorus Alloys for Phosphorus by the Solution Residue-D-C Arc Technique (G. E. Crawley).

Suggested Method for Spectrochemical Analysis of 99.99 percent grade Fine Silver by the Point-to-Plane D-C Arc Technique (E. Manrique).

Suggested Method for Spectrochemical Analysis of Impurities in U_3O_8 by the Silver Chloride Strontium Fluoride Carrier D-C Arc Technique (D. E. Gordanier).

Suggested Method for Spectrochemical Analysis of Tin-Lead Solder by the Point-to-Plane Spark Technique (W. F. Pickup and C. W. Townley).

Suggested Method for Spectrochemical

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Analysis of High Purity Gallium Metal by the D-C Arc Technique (M. S. Wang).

Subcommittee 7 on Aluminum, Magnesium, and Their Alloys (W. H. Tingle, chairman)—The Proposed Method for Spectrochemical Analysis of Aluminum and Alloys by the Point-to-Plane Nitrogen Atmosphere, Spark Technique Using an Optical Emission Spectrometer received approval by Subcommittee 7 ballot and Committee E-2 voice vote and will be submitted to ASTM upon receipt of minor editorial changes.

W. H. Tingle has been appointed as the representative of Committee E-2 on the USA National Committee for ISO/TC 79. The scope of this position includes the newly-formed working group on spectrochemical analysis under SC-1. The USA has the secretariat of this group.

Subcommittee 8 on Refractory Metals, Beryllium and Their Alloys (J. H. Allwein, chairman) has 30 members. Two methods are being readied for publication as suggested methods:

Suggested Method for Spectrochemical Analysis of 6Al-4V Titanium Alloy Using an X-ray Spectrometer (U. Dineen).

Suggested Method for Spectrochemical Analysis of Beryllium Metal by the Stannic Oxide-Barium Hydroxide-Graphite Carrier D-C Arc Technique Using an Optical Emission Spectrometer (L. F. Bunck).

Subcommittee 9 on Ferrous Materials (T. R. Linde, chairman)—The recent activities of Subcommittee 9 have been (1) testing and elevating to standard a number of methods that were urgently needed and (2) reorganizing goals and assignments to increase emphasis on developing X-ray and vacuum spectrometer methods for stainless and tool steels, irons, and heat resistant alloys. The job of planning future activities and delegating responsibility for that work was assigned to the vice-chairman of Subcommittee 9, R. S. Hullings, who became chairman in June 1970.

Assignments on which notable progress was made in 1969 are briefly described below.

(1) A standard method for spectrographic determination of boron in steel has been approved. M. E. Waitleverch showed what can be done in approximately two years to a method that had been on the books for nearly 20 years.

(2) A standard spectrometer method for analysis of low-alloy steel has been approved by E-2. The evaluation of test data and disposition of negative votes were handled by H. Zelinske.

(3) R. Heffelfinger completed work on a proposed method for analysis of high-purity iron which has been approved by E-2.

(4) A method for vacuum spectrometer analysis of low-alloy steel has been tested. The data have been evaluated. Subcommittee 9 is presently voting to elevate this method to standard status. We plan to complete a ballot of E-2 by June 1970.

(5) H. Zelinske wrote a procedure for casting disk samples for spectrographic analysis from molten steel. The procedure has been approved by the Editorial Subcommittee and Subcommittee 9 as a suggested practice and is being voted upon by E-2 to elevate it to a standard practice.

(6) An X-ray method for determination of antimony in steel has been tested and is being prepared for ballot of E-2 by R. S. Hullings.

(7) A task group has been formed and testing has started on a method for vacuum spectrometer analysis of blast furnace iron. The Task Group is headed by A. A. Attaway.

(8) C. Hines' suggested method for the analysis of inclusions extracted from steel has been approved by the Editorial Subcommittee and Subcommittee 9 for publication in the E-2 book.

(9) A suggested method for analysis of low-alloy steel taken into acid solution was prepared by F. Galleta. Testing of the method has been completed. The data are being evaluated.

(10) A suggested practice for remelting steel to obtain disks for spectrochemical analysis, by L. Zeeb and A. Pitchford, has been approved by Subcommittee 9.

(11) A task group headed by J. L. Weber has formulated plans to test and expand Method E 282, for Spectrochemical Analysis of Plain Carbon Low-Alloy Steel by the Point-to-Plane Technique, to cover the determination of all elements normally specified in low-alloy steel.

(12) Work under W. W. Weber on a method to determine residual lead in steel has been curtailed. Test data from three laboratories was not acceptable. It was decided

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that an atomic absorption method should be developed for the determination of residual lead in steel.

Subcommittee 10 on Glass, Ceramics, Alkalies, and Cementitious Materials (P. B. Adams, chairman) has 44 members. Two suggested methods will be submitted for publication in the E-2 book:

Suggested Method for Spectrochemical Analysis of Portland Cement by Fusion with Lithium Tetraborate Using an X-ray Spectrometer (C. Moore).

Suggested Method for Spectrochemical Analysis of Beryllia for Trace Elements by the D-C Arc Technique (F. DeRose).

An extensive program to drop, combine, or promote other methods under the subcommittee jurisdiction is underway. With the cooperation of the parent committees it may be possible to elevate several methods to standard.

Subcommittee 11 on Slags, Ores, and Other Miscellaneous Non-Metallic Materials (M. J. Peterson, chairman) has 47 members. Activities of Subcommittee 11 during the past year are summarized briefly as follows:

(1) *Analysis of Slags* (G. L. Mason, leader)—This is a new task group with the objective of providing optical emission and X-ray spectrometric methods for analysis of steel-making slags. One new suggested method for analysis of slags by T. R. Linde has been approved for publication in the next edition of the E-2 Methods Book. The task force is currently reviewing several methods and cooperative test programs are contemplated on at least two of these.

(2) *Analysis of Water* (G. A. Uman, leader)—Two suggested methods for the analysis of water, one by P. R. Barnett, and one by J. F. Kopp are scheduled for publication in the next edition of the E-2 Methods Book. A bibliography on spectrochemical methods for analysis of water was compiled for the same publication.

(3) *Analysis of Ores, Minerals, and Rocks* (W. L. Ott, leader)—A cooperative test program was completed to elevate Suggested Method for Spectrochemical Analysis of Ores, Minerals, and Rocks by the Fire Assay Preconcentration-Spark Technique. This method is to be balloted on by E-2 as a Standard Method. Approval has been received from E-16.

(4) Other suggested methods approved by the subcommittee and scheduled to appear in the new E-2 Book are:

Suggested Method for Spectrochemical Analysis of Silicates by the Rotating Disk Technique Using an Optical Emission Spectrometer (N. H. Suhr).

Suggested Method for Semiquantitative Spectrochemical Analysis of Miscellaneous Materials (J. Rudolph).

Suggested Method for Spectrochemical Analysis of Miscellaneous Materials by the Powder A-C Arc and Pellet-Spark Techniques (R. C. Gabler, Jr., and M. J. Peterson).

Suggested Method for Spectrochemical Analysis of Geologic Materials by the Fire Assay Preconcentration-Intermittent D-C Arc Technique (J. Haffty and L. B. Riley).

(5) The subcommittee recommended that the following obsolete methods be omitted from the next edition of the E-2 Methods Book: SM 11-3, SM 11-4, SM 11-5, SM 11-7, SM 11-8, and SM 11-12.

Subcommittee 12 on Plastics, Textiles, and Petroleum (M. F. Wilson, chairman) has 67 members—J. Gianelos replaced R. Janiak as X-ray spectrometry chairman and P. Kehres will take over the secretarial duties.

Four new task groups have been formed:

Nylon	M. T. Oliver, chairman
Polyolefins	F. DeRose, chairman
Polyesters	P. Kehres, chairman
Poly(Vinyl chloride)	(no chairman as yet)

Assistance has been sought from the National Bureau of Standards in setting up a series of standards which would simulate the ash of various organic materials and contain trace elements of 17 different metals in the 10 to 100 ppm level for emission analysis. T. W. Mears, Chief, Organic Standards, Office of Standard Reference Materials, reported at the March meeting on a proposal for these standards now before the Bureau for inclusion in the next fiscal year.

A Literature Survey for the Determination of Metals in Plastics and Organic Materials by Optical Emission, X-ray Emission, and Atomic Absorption Methods by Edward Murt will be included in the new E-2 book.

A method by M. T. Oliver, Suggested

REPORT OF COMMITTEE E-2

Method for the Determination of Residual Chromium in Polyethylene by Atomic Absorption Spectrometry, is now being balloted in the subcommittee.

The X-ray spectrometric method for impurities in polyethylene is being re-evaluated preparatory to further testing.

Joint efforts of the Sample Preparation and Optical Emission Sections are being di-

rected toward a general semi-quantitative method for use in preliminary analyses of plastics to determine the metals present.

Respectfully submitted on behalf of the committee,

D. C. SPINDLER,
Chairman

S. H. DEGENKOLB,
Secretary

REPORT OF COMMITTEE E-3 ON CHEMICAL ANALYSIS OF METALS

Committee E-3 on Chemical Analysis of Metals held one meeting during 1969, on June 25 in conjunction with the Annual Meeting of the Society in Atlantic City, N. J. The Executive Committee, Editorial Subcommittee, and the Divisions held meetings June 23, 24, and 25. In addition, the Executive Committee and the Editorial Subcommittee met in Philadelphia, Pa., Nov. 30 through Dec. 3, 1969; Division F (Ferrous Materials) met in Pittsburgh, Pa., Jan. 20 and 21, 1970; Division N (Nonferrous Metals) met in Philadelphia, Pa., Jan. 12 and 13, 1970; and the Molybdenum-Tungsten Task Group of Division R (Refractory Metals) met in Cleveland, Ohio, on March 4, 1970.

The committee membership numbered 207 on Jan. 1, 1970.

The officers elected for the ensuing term of two years are as follows:

Chairman, R. G. Ernst
Vice-Chairman, M. D. Cooper
Vice-Chairman, R. B. Fricioni
Secretary, J. H. Kanzelmemer
Membership Secretary, D. M. Mortimore
Members at Large of Executive Committee, W. R. Bandi and J. I. Shultz

A symposium on Rapid Identification of Metals and Alloys, sponsored by Division G (General Methods) was held in conjunction with the Materials Engineering Congress of the American Society for Metals, Oct. 13 to 16, 1969, in Philadelphia, Pa.

Silve Kallmann has been elected as the next recipient of the Lundell-Bright Memorial Award, which is given for outstanding service to the committee.

RECOMMENDATIONS ACCEPTED BY THE COMMITTEE ON STANDARDS

Subsequent to the 1969 annual report, Committee E-3 presented to the Society through the Committee on Standards the fol-

lowing recommendations, which were accepted effective on the dates indicated:

New Tentative Methods for: (effective Feb. 13, 1970)

E 360 - 70 T, Ferrosilicon and Silicon Metal (Division F)

These methods cover the chemical analysis of ferrosilicon and silicon metal.

E 361 - 70 T, Ferromanganese and Spiegeleisen (Division F)

These methods cover the chemical analysis of ferromanganese and spiegeleisen.

E 362 - 70 T, Silicomanganese and Ferrosilicon Manganese (Division F)

These methods cover the chemical analysis of silicomanganese and ferrosilicon manganese.

E 363 - 70 T, Ferrochromium and Chromium Metal (Division F)

These methods cover the chemical analysis of ferrochromium and chromium metal.

E 364 - 70 T, Ferrochrome-Silicon (Division F)

These methods cover the chemical analysis of ferrochrome-silicon.

E 367 - 70 T, Ferrocolumbium (Division F)

These methods cover the chemical analysis of ferrocolumbium.

E 396 - 70 T, Chemical Analysis of Cadmium Metal (Division N)

These methods cover the chemical analysis of cadmium metal.

E 397 - 70 T, Chemical Analysis of Tungsten (Division R)

These methods cover the chemical analysis of tungsten.

REPORT OF COMMITTEE E-3

Revision of Tentative Methods for: (effective March 13, 1970)

E 315-70 T (formerly E 315-67 T), Chemical Analysis of Molybdenum for Nickel by the Persulfate-Dimethylglyoxime (Photometric) Method (Division R)

The new and revised tentatives appear in the 1970 *Annual Book of ASTM Standards*, Part 32.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee E-3 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which were accepted by the Society effective on the dates indicated:

Revision of Standard Methods for: (effective March 19, 1970)

E 30-70 (formerly E 30-68), Chemical Analysis of Steel, Cast Iron, Open-Hearth Iron, and Wrought Iron (Division F)

The revision consisted of deleting Sections 46-51, 61-72, 73-80, 134-137, 146-147, 155-157, 158-160, 171-174, 175-183, 212-217, 218-226, and 227-237.

E 38-70 (formerly E 38-58), Chemical Analysis of Nickel-Chromium and Nickel-Chromium-Iron Alloys (Division F)

The revision consisted of deleting Sections 22-23, 24-25, 32-33, and 42-49.

E 54-70 (formerly E 54-66), Chemical Analysis of Special Brasses and Bronzes (Division N)

Sections 63-69 were replaced with a revised procedure for zinc by the Ethylenediamine Tetraacetate (Titrimetric) Method.

Adoption of Tentatives as Standard with Revision: (effective March 19, 1970)

E 350-70 (formerly E 350-68 T), Chemical Analysis of Carbon Steel, Low-Alloy Steel, Silicon Electrical Steel, Ingot Iron, and Wrought Iron (Division F)

New methods for carbon, copper, and tin were added.

E 351-70 (formerly E 351-68 T), Chemical Analysis of Cast Iron—All Types (Division F)

New methods for carbon, copper, and tin were added.

E 352-70 (formerly E 352-68 T), Chemical Analysis of Tool Steels and Other Similar Medium- and High-Alloy Steels (Division F)

New methods for carbon and copper were added.

E 353-70 (formerly E 353-68 T), Chemical Analysis of Stainless, Heat-Resisting, Maraging, and other Similar Chromium-Nickel-Iron Alloys (Division F)

New methods for carbon, copper, and tin were added.

E 354-70 (formerly E 354-68 T), Chemical Analysis of High-Temperature Electrical, Magnetic, and Other Similar Iron, Nickel, and Cobalt-Base Alloys (Division F)

New methods for carbon and copper were added.

The new and revised standards appear in the 1970 *Annual Book of ASTM Standards*, Part 32.

ACTIVITIES OF DIVISIONS

Membership Subcommittee (D. M. Mortimore, Membership Secretary)—Supplements to the membership records were issued in June and December, 1969. A roster of voting members is maintained at ASTM Headquarters and the mailing and tabulation of ballots is now handled by Headquarters' Staff. Breakdown of the committee membership follows:

Individual Memberships

Honorary Members	2
Personal Members	51
Company Representatives	154
Total	207

Organizational Memberships

146

Editorial Subcommittee (R. J. Bendure, chairman)—Seventeen methods and one general scope were reviewed and submitted to the Society for approval. Under current re-

REPORT OF COMMITTEE E-3

view are four additional methods covering the analysis of ferrous alloys, titanium and titanium-base alloys, cadmium metal, and ferroalloys. The procedure for committee review and voting of methods has been modified to minimize the time from completion of interlaboratory testing to publication of the methods.

Division F on Ferrous Materials (M. D. Cooper, chairman)—The following task groups have been disbanded by the chairman because their methods have been adopted as standard: Manganese by the Periodate Photometric Method (L. M. Melnick, chairman), Phosphorus by the Molybdenum Blue Photometric Method (R. E. Kohn, chairman), Sulfur by the Gravimetric Method (R. H. Maurer, chairman), Sulfur by the Combustion Iodate Method (E. L. Bennet, chairman), Silicon by the Gravimetric Method (R. E. Kohn, chairman), Cobalt by the Nitroso-R-Salt Photometric Method (R. Pfleger, chairman), Cobalt by the Ion Exchange Potentiometric Titration Method (R. Pfleger, chairman), Nitrogen by the Distillation Photometric Method (R. Bley, chairman), Aluminum by the 8-Quinolinol Photometric Method (R. J. Bendure, chairman), Magnesium by the Atomic Absorption Method (M. D. Cooper, chairman), Copper by the Sulfide Precipitation-Electrodeposition Gravimetric Method (H. W. Huston, chairman), Tin by the Sulfide Precipitation-Iodimetric Method (H. W. Huston, chairman), and Carbon by the Combustion-Gravimetric Method (F. P. Byrne, chairman). The task groups whose methods have been accepted as tentative will remain to perform additional work if necessary.

A new subcommittee, F-2, was established to review Division F methods before submission to committee ballot. Current task group activities are:

Aluminum by the 8-Quinolinol Gravimetric Method (R. J. Bendure, chairman)—A revised draft of the method covering E 350, E 353, and E 354 will be distributed to members of the task group for interlaboratory testing.

Antimony by the Brilliant Green-Photometric Method (J. Penkrot, chairman)—A revised method will be evaluated by four cooperating laboratories and submitted to Subcommittee F-2 for review.

Carbon by the Combustion Thermal Conductivity Method (E. L. Bennet, chairman)—Interlaboratory testing is in progress.

Carbon, Graphitic by the Gravimetric Method (F. P. Byrne, chairman)—The method will be submitted to Committee E-3 for balloting for immediate adoption as standard.

Chromium by the Peroxydisulfate Oxidation Method (Leroy Finch, chairman)—Interlaboratory data are being accumulated.

Copper by the Neo-Cuproine Photometric Method (F. Ruch, chairman)—The method and samples are yet to be distributed for interlaboratory testing.

Lead by the Ion-Exchange Atomic Absorption Method (L. C. Ikenberry, chairman)—Interlaboratory testing of the method is in progress.

Manganese by the Persulfate-Arsenite-Titrimetric Method (W. Bandi, chairman)—Interlaboratory evaluation is in progress.

Microconstituents (W. Bandi, chairman)—Suitable samples for evaluation of a method for alumina have not yet been located. When samples become available, work will continue by this task group.

Nickel by the Dimethylglyoxime-Photometric Method (E. R. Deardorff, chairman)—Preliminary evaluation will be made in two laboratories before the method is submitted to Subcommittee F-2 for review.

Phosphorous by the Alkalimetric Method (R. B. Friconi, chairman)—Additional preliminary evaluation will be made in three cooperating laboratories before full interlaboratory evaluation is begun.

Silicon by the Molybdenum Blue Photometric Method (R. E. Kohn, chairman)—Interlaboratory testing and statistical evaluation are almost complete.

Sulfur by the Chromatographic Separation-Gravimetric Method (R. E. Kohn, chairman)—Interlaboratory evaluation is in progress.

Subcommittee F-1 of Division F, Ferro-Alloys and Alloying Additives (LeRoy Risi, chairman)—The following methods for Subcommittee F-1 of Division F have been approved by Committee E-3 for publication: Arsenic by the Molybdenum Blue Photometric Method (J. C. Cline, chairman), Columbium, Tantalum, Titanium in Ferrocolumbium (LeRoy Risi, chairman), and

REPORT OF COMMITTEE E-3

Aluminum by the 8-Quinolinol Photometric Method (R. J. Bendure, chairman).

Current task group activities are:

Boron by the Monomethylthionine Extraction-Photometric Method (Mary Lou Harmon, chairman)—Because of difficulties encountered in the proposed method, this task group has been temporarily disbanded.

Calcium and Magnesium-Chelometric Method (J. C. Cline, chairman)—The proposed method will be submitted to Subcommittee F-2 for review. Interlaboratory evaluation will then be initiated.

Lead by the Dithizone Photometric Method (LeRoy Risi, chairman)—Interlaboratory data are completed. This method will be submitted to Committee E-3 for balloting.

Molybdenum in Ferromolybdenum and Molybdenum Oxide (J. W. Mann, chairman)—Two methods are being evaluated in the chairman's laboratory. The method selected will be tested in two additional laboratories before review by Subcommittee F-2 and formation of a task group.

Tin by the Pyrocatechol Photometric Method (G. Porter, chairman)—If a performance specification can be made available for the pyrocatechol dye, the tin task group can be reactivated and interlaboratory evaluation can proceed using the method as previously written.

Vanadium in Ferrovandium (G. Porter, chairman)—A task group has been established for interlaboratory testing.

Sampling of Ferro-Alloys—A task group with LeRoy Risi as chairman will be formed to update Method E 32, Sampling Ferro-Alloys for Determination of Chemical Composition.

Division G on General Analytical Methods (F. P. Byrne, chairman)—This division, under its new chairman, is in the process of reorganization. Subcommittee G-3 on Common Procedures has been disbanded. The division is considering topics for future symposia as well as continuing its review of the Recommended Practices E 50, for Apparatus, Reagents, and Safety Precautions for Chemical Analysis of Metals, Recommended Practice E 60, for Photometric Methods for Chemical Analysis of Metals, and Recommended Practices E 173, for Conducting Interlaboratory Studies of Methods for Chemical Analysis of Metals.

Division I on Gases in Metals (W. F.

Harris, chairman)—The Division I Editorial Subcommittee is working on a proper format for divisional methods. Interlaboratory testing has been completed on the following methods which will be submitted to ballot when written in the approved format:

Oxygen in Hafnium and Zirconium (S. Kallmann)

Oxygen in Copper (Virginia Horrigan)

Oxygen in Tantalum

Editorial work is being completed on the following apparatus and methods write-ups (F. Valente):

Hot Extraction Apparatus

Vacuum Fusion Apparatus

Inert Gas Fusion Apparatus

Austenitic Steels—Hydrogen by the Hot Extraction Method

Titanium and Titanium-Base Alloys—Hydrogen by the Hot Extraction Method

Titanium and Titanium-Base Alloys—Oxygen by the Platinum Flux-Vacuum Fusion Method.

Zirconium and Zirconium-Base Alloys—Oxygen by the Inert Gas Fusion Method Using the Platinum Flux Noncycling Technique.

Division M on Miscellaneous Metals (S. Kallmann, chairman)—Silve Kallmann assumed the chairmanship of the Division following S. Vigo's resignation. Task group activity continues in the following areas:

Uranium (S. Kallmann)—Methods for iron, nickel, chromium, and carbon are being tested.

Zirconium-Hafnium (R. T. Van Santen, chairman)—Methods are being tested for tin, iron, chromium, nickel, and copper in zirconium and zirconium alloys. The group is developing a method for phosphorous.

Titanium—Methods are being tested for zirconium, aluminum, and two photometric methods for molybdenum in titanium alloys. Atomic absorption methods for aluminum, vanadium, chromium, molybdenum, zirconium, and silicon in titanium alloys are also being investigated.

Metal Powders (P. D. Johnson, chairman)—Procedures are being tested for hydrogen loss in cobalt, copper-tin-lead, lead-tin, iron-copper, nickel, and tin powders. Methods are under investigation for total carbon in iron powder. Methods for the analysis of tungsten carbide, iron-copper, and copper-

REPORT OF COMMITTEE E-3

tin premix powders, and on solder powder and tin powder are being considered.

Division N on Nonferrous Metals (G. B. Wengert, chairman)—Much emphasis has been placed on developing a format for atomic absorption methods for the analysis of nonferrous metals. A task group has been established to formulate a document similar to the recommended practices for photometric methods (E 60) that would be used informally within the division.

Current task group activities are:

Aluminum (W. E. Pilgrim, chairman)—The new chairman of this group has begun work on methods for cadmium, titanium, and arsenic.

Beryllium (S. Kallmann, chairman)—Five methods are in the final stages of testing. A method for bromine-methanol insoluble material is being studied.

Cadmium (J. Aldrich, chairman)—Photometric methods for copper, lead, and thallium have been accepted by the Society as tentatives. Atomic absorption methods for copper, silver, lead, and zinc have been accepted by the committee. A colorimetric method for arsenic is in editorial review. Additional testing is being undertaken for methods for tin and antimony.

Copper (L. W. Anderson, chairman)—Tests of methods for copper, zinc, manganese, and lead have been completed. Methods for cobalt, beryllium, tin, iron, nickel, sulfur, and zinc are in progress. Methods for low levels of selenium and phosphorus in high-purity copper are being investigated.

Lead (G. D. Haines, chairman)—Atomic absorption methods for bismuth, silver, copper, and zinc are being tested. A colorimetric method for bismuth is also being considered. Arsenic, antimony, and tin remain to be studied.

Lithium (C. M. Frye, chairman)—No activity is reported by this task group.

Magnesium (G. B. Wengert, chairman)—Methods that are the same as or similar to ASTM methods for zirconium, manganese, nickel, and rare earths are being tested by ISO.

Nickel (A. D. Middleton, chairman)—Studies are being undertaken to determine the applicability of atomic absorption for the determination of lead, tin, and zinc in nickel. This task group is assuming the responsi-

bility for analysis of electronic grade nickel and metal seal alloys formerly handled by Subcommittee 9 of ASTM Committee F-1 (recently disbanded).

Silver Brazing Alloys (G. F. Donahue, chairman)—Determination of lead, tin, iron, and nickel in these materials is at present of little commercial interest. Methods now under development by other groups will eventually be tested for these applications.

Sodium (D. Dutina, chairman)—This task group has encountered insurmountable difficulties in obtaining suitable samples for interlaboratory testing and has become inactive.

Zinc (J. Aldrich, chairman)—Methods and samples for interlaboratory testing of new methods for the analysis of zinc and zinc alloys are nearly complete. Atomic absorption methods for lead, iron, tin, copper, cadmium, and an EDTA titrimetric method for aluminum are being written.

Division R on Refractory Metals (R. B. Frictioni, chairman)—Task group activities are:

Molybdenum-Tungsten (J. W. Mann, chairman)—Methods for the determination of molybdenum by the Thiocyanate Photometric Method and iron by the 1,10-Phenanthroline Photometric Method in tungsten appear in the 1970 *Annual Book of ASTM Standards*, Part 32. Silicon by the Molybdenum Blue Extraction-Photometric Method is ready for committee ballot.

Carbon (F. P. Byrne, chairman)—Methods for carbon in refractory metals are being evaluated.

Nickel in Tungsten (S. Kallmann, chairman)—A method is being tested.

Aluminum in Tungsten (J. W. Fulton, chairman)—A suggested method is being evaluated.

Nitrogen in Tungsten (F. Coyle, chairman)—Samples containing 10 to 15 ppm of nitrogen are being prepared. Two methods are being considered for testing.

Titanium and Zirconium—Chairmen are needed to head these task groups.

Respectfully submitted on behalf of the committee,

R. G. ERNST,
Chairman

J. H. KANZELMEYER,
Secretary

REPORT OF COMMITTEE E-4 ON METALLOGRAPHY

Committee E-4 on Metallography and its subcommittees held two meetings during the year: on June 22 to 24, 1969, at Atlantic City, N. J., and on Dec. 2 to 4, 1969, at Pittsburgh, Pa. The committee consists of 144 voting members.

The committee will meet with the Society at the Annual Meeting in Toronto, Canada, on June 22 to 24, 1970. A feature of this meeting will be a day-long symposium, sponsored by Committee E-4 and promoted by its Subcommittee XV. The title of the symposium is Energy Dispersion X-ray Analysis.

The committee will also meet in Philadelphia on Dec. 8 to 10, 1970.

The committee sponsored a highly successful symposium entitled "Application of Modern Metallography" in conjunction with the 1969 Materials Engineering Congress and Exposition held in Philadelphia, Oct. 13-16, 1969.

In recognition of his valuable contributions to the committee Dr. Victor Hicks was awarded an honorary membership on Committee E-4.

The following officers were elected for ensuing term of two years:

Chairman, W. D. Forgeng, Sr.

Vice-Chairman, A. W. Danko

Secretary, J. C. Russ

Membership Secretary, R. M. Slepian

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee E-4 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which became effective on the dates indicated:

New Standard:

E 391 - 69, Recommended Practice for Presentation of Phase Diagrams (Subcommittee III) (effective Oct. 17, 1969)

There was a need for a practice to cover the drawing of phase diagrams for publications.

Revision of Standard:

E 157 - 70 (formerly E 157 - 63), Method for Assigning Phase Designations in Metallic Systems (Subcommittee III) (effective June 12, 1970).

This method was revised for clarification.

Reapproval of Standards:

E 2 - 62 (1969), Preparation of Micrographs of Metals and Alloys

E 3 - 62 (1969), Preparation of Metallographic Specimens

E 7 - 63 (1969), Terms Relating to Metallography

E 14 - 63 (1969), Recommended Practice for Thermal Analysis Metals and Alloys

E 45 - 63 (1969), Recommended Practice for Determining the Inclusion Content of Steel

E 80 - 63 (1969), Recommended Practice for Dilatometric Analysis of Metallic Materials

E 81 - 63 (1969), Preparing Quantitative Pole Figures of Metals

E 82 - 63 (1969), Determining the Orientation of a Crystal

E 112 - 63 (1969), Estimating the Average Grain Size of Metals

E 189 - 63 (1969), Recommended Practice for Determining Temperature-Electrical Resistance Characteristics (EMF) of Metallic Materials

The new standard appears in the 1970

REPORT OF COMMITTEE E-4

Annual Book of ASTM Standards, Part 31. The revised standard is available as a separate reprint.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee I on Selection and Preparation of Samples (S. M. Purdy, chairman)—Final editing of the draft on the new proposed standard for microetchants is to be completed and submitted to subcommittee letter ballot. The Task Groups on Mechanical Polishing (101), Safety (103) and Macroetching (104) are working and making progress. It has been suggested that this subcommittee could perform a great service by compiling a booklet on the identification of phases by etching. A committee was appointed to study this suggestion.

Subcommittee II on Definitions (Miss M. R. Norton, chairman) is reviewing the definitions relating to metallography. A task group composed of members from Committees E-4 and E-25 has been formed to resolve the differences in definitions between Definitions E 7 and E 175.

Subcommittee III on Nomenclature (W. J. Fink, chairman)—The recommended practice for presentation of phase diagrams was adopted by the Society and became Recommended Practice E 391-69. The subcommittee prepared and submitted revisions to Method E 157. These actions complete the activities of this subcommittee. To maintain continuity a nucleus of six members will be retained for the next two years to oversee the standards prepared by this subcommittee.

Subcommittee IV on Photography (Mrs. C. B. Craver, chairman) is continuing its efforts to revise Standard Method E 2.

Subcommittee V on Microhardness Testing (L. Toman, Jr., chairman) has approved changes to two sections of Standard Method E 384 and is continuing its efforts to make the standard more accurate and useful.

Subcommittee VI on X-ray Methods (R. K. Scott, chairman) reports that of the six sections of the Manual on X-Ray Diffraction two have been approved, three are near approval, and the one remaining will require more work for satisfactory completion.

Subcommittee VII on Thermal Analysis Methods (D. I. Finch, chairman) did not meeting during the past year.

Subcommittee VIII on Grain Size (E. F. O'Mara, chairman) is conducting a round-robin study on the oxidation method by Task Group 801. Two other task groups are reporting to the Committee: TG 802 on Automatic Methods for Grain Size Measurement and TG 803 on the Intercept Method.

Subcommittee IX on Inclusions (G. Mel-drum, chairman) has prepared a procedure for the Detection of Inclusions in Bearing Quality Steel by the Ultrasonic Method. TG 903 has been formed and is actively engaged in the Development of Cleanliness Chart for the High-Temperature Alloys.

Subcommittee X on Research (D. I. Finch, chairman) did not meet during this past year.

Subcommittee XI on Electron Microscopy and Diffraction (G. E. Pellissier, chairman) conducted a survey of the membership to determine how the objectives of the subcommittee may be accelerated. Three areas of work were suggested: (1) development of a standard for replication technique, (2) interpretation of transmission electron micrographs, and (3) development of standard methods.

Subcommittee XIV on Quantitative Metallography (S. M. Purdy, chairman) has TG 1401 on Hand Methods and TG 1402 on Semiautomatic Methods cooperating on the reading of test packets distributed by TG 1401. TG 1403 on Automatic Methods has prepared a list of scanning instruments for quantitative microscopy.

Subcommittee XV on Scanning Microscopy and Microprobe (E. Eichen, chairman) is arranging a symposium entitled Energy Dispersion X-ray Analysis to be presented at the 1970 Annual Meeting. Seven task groups have been formed and assigned specific tasks.

Special Task Groups:

Committee E-4 has three special task groups reporting to the Executive Committee:

Task Group 001 on Phase Identification in Superalloys (M. J. Donachie, Jr., chairman) is very active in its field and has prepared a suggested Procedure for the Separation

REPORT OF COMMITTEE E-4

tion of Phases by Anodic Dissolution which will be subjected to tests by the members of the group.

Task Group 002 on Mossbauer Effect (Rolfe Herber, chairman) has submitted a final report to the Executive Committee by offering a Suggested Nomenclature and Conventions for Reporting Mossbauer Effect Data. A committee is reviewing the paper and it would appear that this work should be published as an ASTM proposed

standard in the Related Materials section of the *Book of ASTM Standards*.

Task Group 003 on Government Standards for Testing Procedures (L. Toman, Jr., chairman) submitted no report.

Respectfully submitted on behalf of the committee,

W. D. FORGENT, SR.,
Chairman.

E. F. O'MARA,
Secretary

REPORT OF COMMITTEE

E-5 ON FIRE TESTS OF MATERIALS AND CONSTRUCTION

Since last reporting to the Society, Committee E-5 on Fire Tests of Materials and Construction, together with its subcommittees, met at ASTM headquarters in Philadelphia, Pa. in October 1969.

The latest report of the membership secretary notes that the present membership of the committee consists of 54 producers, 21 consumers, 34 general interest, and 3 honorary members for a total voting membership of 109.

The committee has recently learned with regret of the death of A. L. Brown who had been an active member of Committee E-5 since 1937, serving as chairman of the main committee from 1948 to 1956. His service to the committee was recognized by unanimous election to honorary membership in February 1966.

Following the unanimous and enthusiastic endorsement of the committee, arrangements have been made to establish an award to be sponsored by Committee E-5 and to be known as the S. H. Ingberg Award. The award, in the form of a certificate, is to be presented, wherever warranted, in recognition of outstanding achievements or contributions in the field of standards related to fire tests.

A further amendment to the bylaws has been accepted by the committee, which provides that members may be added at any time by two-thirds affirmative ballot of the Executive Committee and subject to the approval of the Board of Directors of the Society.

The following officers have been elected for the ensuing two-year term:

Chairman, C. H. Yuill

First Vice-Chairman, W. F. Aikman

Second Vice-Chairman, J. V. Ryan

Secretary, N. S. Pearce

Membership Secretary, J. E. Ryan

RECOMMENDATIONS ACCEPTED BY THE COMMITTEE ON STANDARDS

Subsequent to the 1969 annual report, Committee E-5 presented to the Society through the Committee on Standards the following recommendations, which were accepted effective on the dates indicated:

Tentative Revision of Standard:

E 119 - 69, Fire Tests of Building Construction and Materials (Subcommittee I) (effective July 24, 1970)

Extensive editorial revisions were made to the existing tentative revision to Sections 23, 24, and 25.

The tentative revision appears in the 1970 *Annual Book of ASTM Standards*, Part 14.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee E-5 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which were accepted by the Society effective on the dates indicated:

Reapproval of Standards:

E 69 - 50 (1969), Method of Test for Combustible Properties of Treated Wood by the Fire Tube Apparatus

E 108 - 58 (1970), Methods of Fire Tests of Roof Coverings

E 160 - 50 (1969), Method of Test for Combustible Properties of Treated Wood by the Crib Test

The reapproved standards appear in the 1970 *Annual Book of ASTM Standards*, Part 14.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee I on Construction Assem-

REPORT OF COMMITTEE E-5

blies (J. A. Bono, chairman)—A proposed revision to Methods E 119, Fire Tests of Building Construction and Materials, which introduces new criteria for the classification of assemblies and structural members, and which has been actively considered in various versions for the past seven years appeared to be close to acceptance by committee members. This latest proposal maintains the concept of the two classifications "restrained" and "unrestrained." Certain of the acceptance criteria relating to the restrained classification have been made somewhat more stringent and an explanatory nonmandatory guide has been added in the form of an appendix to assist users in judging restrained and unrestrained conditions in actual building construction. It was intended that the proposal be processed as a tentative revision to the standard following simultaneous letter ballot of the subcommittee and main committee.

A further proposed revision to Methods E 119 has been circulated to simultaneous letter ballot of the subcommittee and main committee. The proposal, which would add an appendix to the standard, gives a procedure for correcting the fire endurance of unprotected vertical or horizontal slabs (solid or hollow) to a standard fire endurance, should the fire test be conducted when the test specimen is at a moisture level other than that prescribed by the test method.

The task group on ceiling constructions is working on a major revision to the standard on the section concerned with tests of ceiling constructions.

The task group concerned with loading of wood studs continues to investigate this matter.

The tentative revision to Section 6 of Methods E 119 referring to the special requirements concerning test assemblies employing built-up roof coverings has been sent for letter ballot of the full committee.

Future consideration would be given by the subcommittee to the possibility of standardizing certain characteristics of fire tests on floors incorporating membrane ceilings as well as the question concerning the advisability of deleting from Methods E 119, the alternative test of protection for solid structural steel beams and girders.

Subcommittee III on Fire Tests of Wall

Opening Assemblies (R. McNeil, chairman)—Task Group 1 had reported some inconsistency in radiometer readings obtained during fire tests of doors which were apparently attributed to varying surface treatments or foreign deposits accumulating on the door surface. It had been concluded by the task group that the method of temperature measurement specified in Methods E 152, Fire Tests of Door Assemblies, using thermocouples and asbestos pads was adequate at the present time.

Task Group 2 is currently reviewing available standards related to the fire testing of wall louvers and dampers.

Previous discussions within the subcommittee had questioned the precise technique for application of the hose stream as required by Section 9 of Method E 152. An explanatory note would be added to Section 9(c) which would shortly be circulated to members of the subcommittee for letter ballot.

A task group has been established with the object of developing a test method for evaluating the resistance to the passage of smoke by closures in wall assemblies.

A further task group has been appointed to investigate the possibility of eliminating the hose stream portion of the test procedure for fire doors classified for periods of 30 min or less.

Subcommittee IV on Fire Tests of Acoustical and Similar Finishes (H. W. Eickner, chairman)—The Task Group on Smoke continues to acquire information on the general subject of smoke development and measurement and a white paper on this subject has been circulated to subcommittee members for information and comment.

The Task Group on Toxicity of Combustion Products has reviewed a number of articles on this subject and is following with interest the results of a current series of tests to study the presence of toxic products when furnishings in a room are ignited.

The Task Group on Flammability of Floor Coverings had reported upon the need for establishing a joint committee with Committee D-13. This was because the task group had learned that D-13 is developing a flammability test for carpets and hence there is a need to maintain coordination between the two committees.

It was evident from the findings of the

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task group thus far that it would probably be necessary to develop more than one type of fire condition in order to fully evaluate the potential fire hazard of the variety of floor coverings which could be encountered.

The subcommittee has recently conducted a simultaneous letter ballot of the main committee and subcommittee members concerning the adoption of a proposed revision to Method E 84, Surface Burning Characteristics of Building Materials, which would modify the significance of the data obtained during the test concerning the fuel contributed and smoke developed. The amendment is being processed as a revision to the standard and in the meantime the task group continues to study the hazard and measurement of fuel contribution and smoke density.

Subcommittee V on Nomenclature and Definitions (I. A. Benjamin, chairman)—A task group of the subcommittee continues to review the significance of the scope of Method E 136, Noncombustibility of Elementary Materials. It had been decided at a recent meeting of the subcommittee to defer a recommendation concerning a revision to the scope until the subcommittee had determined the reaction of the subcommittee members to a proposed revision of the test method.

It was reported that the Potential Heat Test Method Inter-Laboratory Comparison Test Report was available for distribution and would be included in STP 464.

Subcommittee X on Research (G. Shorter, chairman)—An ASTM special technical publication, STP 464, had been prepared concerning the papers presented at the Denver Symposium on Fire Test Methods.

It had been concluded in the subcommittee on the question of reviewing plans for fire tests in existing buildings or simulated constructions that there should be no attempt to prepare plans for such tests, but the subcommittee would be prepared to review reasonably objective plans prepared for the purpose of acquiring basic research information which would not otherwise be obtainable. It was intended that the Subcommittee X review be directed towards assisting the subcommittee in realizing the objectives of the test by suggesting how additional research information could be obtained.

Preliminary plans are underway for the

next symposium of Committee E-5 to be arranged to coincide with the next plenary meeting of ISO/TC 92, to be held in the United States in the fall of 1971. While there will be no formal ASTM meetings associated with this symposium, the objective is to provide a basis of gathering E-5 members at the time of the ISO meetings, and thus provide an opportunity for interaction of the two groups. Presently suggested subjects for the symposium are: (a) the smoke problem including the toxicity aspect; (b) the design of buildings for fire endurance; (c) hazardous material in construction. It is hoped that such an arrangement will provide the symposium chairman with an opportunity for obtaining papers authored by people attending the ISO session from other countries.

The next review session sponsored by Subcommittee X was scheduled for February of 1971.

Subcommittee XI on Editorial (B. Cohn, chairman)—Members of the subcommittee have recently reviewed and made extensive editorial revisions to the proposed Appendix IV to Method E 119, Fire Tests of Building Construction and Materials. It was anticipated that this test method will be reviewed and paragraphs renumbered as well as the metric equivalents added during the next few months.

Following the completion of the work concerning Method E 119 only two standards under the jurisdiction of Committee E-5 remain to be renumbered and to be edited to include metric equivalents. The standards yet to be revised are Methods E 108, Fire Tests of Roof Coverings, and E 136. These standards will be held up until some revisions to the standards presently under preparation have been included.

Subcommittee XII on International Standards (A. Robertson, chairman)—Members of this committee have recently actively participated in the Sixth Plenary Meeting of ISO/TC 92 in Copenhagen, Denmark. During this meeting the representatives from the United States of America had been successful in having revisions it had proposed incorporated in the draft proposal for tests of doors and shutters. The USA delegation had also constructively participated in discussions concerned with loading restraint and deformation of structures during fire endurance

REPORT OF COMMITTEE E-5

ance tests.

The members of Subcommittee XII had been reminded of their responsibilities in providing liaison with the various groups and organizations interested in the work of ISO/TC 92. Subcommittee XII is expected to work with the secretariats of ISO/TC 92, through ANSI, in developing plans for the fall meeting in 1971. A task group is to be assigned at a later date to develop the detailed plans for the meeting.

A report has been presented to subcommittee members concerning the present limited success of the subcommittee in developing a fund in support of travelling expenses in connection with attendance at ISO meetings.

Respectfully submitted on behalf of the committee,

C. H. YULL,
Chairman

N. S. PEARCE,
Secretary

REPORT OF COMMITTEE E-6 ON PERFORMANCE OF BUILDING CONSTRUCTIONS

Committee E-6 on Performance of Building Constructions held three meetings during the year: the 29th Meeting was held Feb. 3 to 5, 1969, at the Hilton Hotel in Denver, Colo.; the 30th Meeting on June 24 to 26, 1969, at Haddon Hall in Atlantic City, N.J.; and the 31st Meeting on Dec. 9 to 11, 1969, at the Netherlands Hilton Hotel in Cincinnati, Ohio.

The total number of voting members is 144 with the following classification breakdown: 63 producers, 9 consumers, and 72 general interest.

The name of the committee was changed from "Methods of Testing Building Construction" to "Performance of Building Construction." To support the policy implied by the title change, the Executive Committee, as empowered by the bylaws, restructured subcommittee activities as follows (names in parentheses being the chairmen):

E6.1 Structural Performance

E6.11 *Structural Performance of Horizontal Building Construction* (F. C. Pneuman)

E6.12 *Structural Performance of Vertical Building Construction* (H. D. Angleton)

E6.13 *Structural Performance of Joining and Fastening* (E. G. Stern)

E6.14 *Structural Performance of Complete Buildings* (W. R. Schriever)

E6.2 Service Performance

E6.21 *Service Performance of Building Construction* (I. A. Benjamin)

E6.3 Acoustical Performance

E6.31 *Joint Subcommittee on Sound Transmission* (Committees E-6 and C-20) (K. S. Oliphant)

E6.4 Infiltration Performance

E6.41 *Infiltration Performance of Building Construction* (C. B. Monk, Jr.)

E6.5 Component Performance

E6.51 *Curtain Walls, Windows, and Doors* (H. R. Trechsel)

E6.9 Administrative

E6.91 *Executive* (R. W. Bletzacker)

E6.92 *Planning* (R. W. Bletzacker)

E6.93 *Editorial* (R. A. Jones)

E6.94 *Nomenclature and Definitions* (W. F. Aikman)

During the Denver Winter Meeting a Research Review Session was held as a joint meeting with Committee C-20 on Feb. 4, 1969. Under the able chairmanship of K. S. Oliphant a well-attended meeting heard a comprehensive review of the acoustical work in Subcommittees E6.31 under both Committees E-6 and C-20.

By Executive Committee action at the Atlantic City meeting, June 26, 1969, it was recommended that the Durability of Insulating Glass research program be accepted as an ASTM sponsored effort. Following acceptance of this recommendation by ASTM Headquarters, the chairman, during the Cincinnati meeting Dec. 11, 1969, established a Technical Advisory Committee for this effort. G. A. Wilson was designated by the ASTM staff as project coordinator.

During the Denver meeting the chairman established a review of ASTM Standard E 72 through an ad hoc committee under the chairmanship of G. D. Ratliff. A recommendation from the committee was received at the Atlantic City meeting to split this standard into five parts and assign them to the new subcommittees as follows:

- (1) Axial loading, Subcommittee E6.12,
- (2) Transverse, Subcommittee E6.11,
- (3) Indentation and Impact, Subcommittee E6.21,
- (4) Racking, Subcommittee E6.12, and
- (5) Combined Axial and Transverse, Subcommittee E6.12

The chairman has assigned the committees as recommended the task of preparing sepa-

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rate test methods for this much-used standard.

The following Awards were received by Committee E-6 members:

Honorary Society Membership, H. C. Plummer and E. C. Shuman

Walter C. Voss Award, R. E. Copeland

Award of Merit, W. F. Aikman

Honorary Committee E-6 Membership, R. F. Legget and L. J. Markwardt

The following officers were elected for the ensuing two-year term:

Chairman, R. W. Bletzacker

First Vice-Chairman, J. D. Thompson

Second Vice-Chairman, R. A. Jones

Membership Secretary, D. J. Vild

Secretary, H. Trechsel

Member-at-Large, I. A. Benjamin

Currently under balloting by the main committee are: a new Tentative Classification for Determination of Sound Transmission Class (formerly RM 14-2) and an editorial modification to Standard Method E 72 Conducting Strength Tests of Panels for Building Construction. The advancement of RM 14-2 is in accordance with the required Society policy that such documents be advanced within the limits prescribed by the bylaws.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee E6.11 on Structural Performance of Horizontal Building Construction (F. C. Pneuman, chairman)—A change in the scope of the revision to Method E 73, Testing Truss Assemblies, was developed to overcome negative votes expressed on Society ballot and the revision was resubmitted for Society ballot. Three test methods are under study by this group: (1) Test of Framed Floor or Roof Diaphragm Constructions for Buildings, (2) Standard Method of Testing Beams for Building Construction, and (3) A Transverse Load Test for Panels (from Method E 72). The Diaphragm Test is in its eighth draft and is being submitted to the full subcommittee for approval.

Subcommittee E6.12 on Structural Performance of Vertical Building Construction (H. D. Angleston, chairman) has been assigned the responsibility for the following parts of Method E 72: (1) Axial compression and Tensile load tests, (2) Racking load tests, and (3) Combined axial compression and

transverse load tests. Two task groups have been appointed to handle the racking load tests. One will retain the current Method E 72 emphasis on the evaluation of sheathing materials on a wood stud frame; the other, to develop new test procedures for vertical elements. A third task group is preparing a method of test for compression prisms.

Subcommittee E6.13 on Structural Performance of Joining and Fastening in Building Constructions (E. G. Stern, chairman) has numerous task groups engaged in such matters as Compatibility of Fasteners and Fastening Systems with Materials Joined, Determining Tensile Properties of Metal Truss Plates, Determining Ductility and Pliability of Wire Nails, and Collation and Analysis of Joining and Fastening Failures in Buildings Related to Disasters. The latter activity has received much attention in this subcommittee, a highlight of which was the chairman's slides and analysis of damage caused by hurricane "Camille."

A new subject considered by the subcommittee has been the anchorage of clay products. The use of masonry metal ties lacks appropriate test methods to evaluate their strength for vertical and lateral wall load action plus the effect of differential wall movements.

Subcommittee E6.14 on Structural Performance of Complete Buildings (W. R. Schriever, chairman)—A highlight of this committee is a Recommended Practice for Field Load Testing of Buildings. This recommendation points out the interaction that exists between structural analysis, structural models, structural prototype, and full-scale field tests. It recognizes the legal ramifications of field tests and attempts to put their technical significance into proper perspective. A new topic considered is the need for full-scale dynamic tests on structures. The shaking of buildings to determine their period and dampening characteristics is widely used in earthquake areas. Efforts are being made to contact experts on the west coast with experience in this area. A list is to be prepared of names active in this field to determine if a favorable opinion exists for the need of test methods.

Subcommittee E6.21 on Service Performance of Building Construction (I. A. Benjamin, chairman), is in the process of preparing

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a Method of Test for Sprayed Fire Insulating Materials. Three negative votes (received on the fourth draft) are being resolved pending submission to the main committee. Recently, a request was received from BOCA indicating a need for testing the weather-protection effectiveness of exterior cladding. Questions of moisture protection involving wall ventilation and vapor barriers were raised. Action by the committee is still pending.

Joint Subcommittee E6.31 on Sound Transmission (Committees E-6 and C-20) (K. S. Oliphant, chairman)—The scope of this subcommittee's activities may be judged by the following list of task force activities:

- (1) A test method for attenuation of ceiling acoustical tile,
- (2) A study of the results from the field sound transmission loss method (E 336 - 67 T),
- (3) Preparation of a test method based on the use of the ISO Impact Machine,
- (4) A study of surface generated noise on horizontal building elements (floor and floor coverings), and
- (5) A round-robin test to determine the sound transmission loss of Lead-X material. Six laboratories are participating: Riverbank, Cedar Knolls, Geiger & Hamme, Owens-Corning Fiberglas, Kodaras, and U. S. Gypsum.

Subcommittee E6.51 on Component Performance of Curtain Walls, Windows and Doors (H. R. Trechsel, chairman) has been the most productive in the past year in producing standards. Revisions to Method E 330, Test for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference, and Method E 331, Test for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference, and a new standard Method E 405 Wear Testing Rotary Operators for Windows, have been submitted to Society letter ballot.

In addition to the above activities, the subcommittee has task force activities on:

- (1) Durability—currently directing its attention to the insulating glass research program noted above (See Part I, D-2).
- (2) Air Leakage—planning a revision to the method of test calibration of E 283.
- (3) Thermal—exploring a new test method determining the resistance of windows to surface condensation.

Respectfully submitted on behalf of the committee,

R. W. BLETZACKER,
Chairman

C. B. MONK, JR.,
Secretary

REPORT OF COMMITTEE E-7 ON NONDESTRUCTIVE TESTING

Committee E-7 on Nondestructive Testing and its subcommittees met in Atlantic City, N. J., on June 23 to 26, 1969, during the Annual Meeting of the Society. The Executive Committee and all subcommittees also met on Jan. 12 to 14, 1970, during the ASTM January 1970 Committee Week in Fort Lauderdale, Fla. Additional working sessions of task groups in Subcommittee II and Subcommittee VI also were scheduled during the report period.

Committee E-7 consists of 175 voting members and 55 consulting (non-voting) members. Membership of this committee is not classified as to producer, consumer, or general interest categories. The scope and functions of the committee do not have a commercial bearing.

In response to a Society directive, a new system of numerical designations of the committee, all subcommittees, and sections was developed for implementation on July 1, 1970. Subcommittee IV on Glossary of Nondestructive Testing Terms was discontinued and was redesignated as the Administrative Subcommittee E07.92 on Definitions and Nomenclature.

A new task group was appointed in Subcommittee II to initiate work on the development of reference radiographs for titanium castings and welds. New work on the development of leak testing practices for semiconductors and electronic components and for leak testing of pressure equipment also was authorized and will be under the jurisdiction of several new sections in Subcommittee VIII.

In response to requests for the development of recommended practices for the nondestructive testing of rubber tires, cooperative effort was initiated with Committee D-11 on Rubber and Rubber-like Materials to investigate the need for par-

ticular test procedures and to develop an appropriate scope of activities. A new task group also was formulated in Subcommittee III to establish liaison with E. C. Miller of ASME in order to resolve existing differences between the ASME Boiler Code and ASTM Recommended Practices E 109, E 138, and E 165.

The Noah Kahn Award for the year 1970 was presented to Roger Logar of the Polytechnic Institute of Brooklyn and to Erik Randich of Lehigh University. This award is presented each year to an outstanding graduating student at each institution in the field of metallurgical engineering or materials aspects related thereto.

Subsequent to his retirement, D. M. McCutcheon, formerly of the Westinghouse Electric Co., was installed as honorary member of Committee E-7. After a lingering illness, Paul Busby died in late 1969. Mr. Busby was active for many years in Subcommittee I on Radiography. Shortly after his appointment as chairman of Subcommittee III, Jere E. Rolfe died suddenly in May 1970. Mr. Rolfe also was a longtime participant in the affairs of Subcommittee III on Magnetic Particle and Penetrant Inspection.

Upon the retirement of H. Migel, J. E. Rolfe was appointed chairman of Subcommittee III; Mr. Rolfe has since been succeeded by J. Borucki, Magnaflux Corporation, who was designated acting chairman pending his final acceptance of the appointment later. P. C. McEleney, Watertown Arsenal, was appointed as chairman of Subcommittee VII to succeed N. H. Cale who retired and resigned.

As a result of action by the Nominating Committee and a subsequent Committee E-7 letter ballot, the following committee officers were elected for a two-year term from

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June 1970 to June 1972:

Chairman, R. E. Turner
First Vice-Chairman, R. W. McClung
Second Vice-Chairman, D. Polansky
Secretary, F. C. Panian
Membership Secretary, R. B. Moyer

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee E-7 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which became effective on the dates indicated:

New Standard:

E 390 - 69, Reference Radiographs for Steel Fusion Welds (Subcommittee II) (effective Oct. 17, 1969)

This recommendation was prompted by a number of requests from members representing producers and users of welded steel products who expressed a need for reference radiographs describing the types and severity levels of discontinuities revealed by radiographic inspection of welds in steel products.

Tentative Adopted as Standard Without Revision:

E 376 - 69 (formerly E 376 - 68 T), Recommended Practice for Measuring Coating Thickness by Magnetic Field or Eddy Current (Electromagnetic) Test Methods (Subcommittee VII) (effective Oct. 17, 1969)

Reapproval of Standards:

E 155 - 64 (1970), Reference Radiographs for Inspection of Aluminum and Magnesium Castings (Series III) (Subcommittee II)

E 192 - 64 (1970), Reference Radiographs of Investment Steel Castings for Aerospace Applications (Subcommittee II)

ACTIVITIES OF SUBCOMMITTEES

Subcommittee I on Radiographic Practice and Penetrators (J. Delisa, chairman)
—During the past year, activity in this

subcommittee was confined to task groups as follows:

Task Group A on Penetrators and Indicators of Radiographic Quality (C. H. Voelker, chairman) has undertaken a comprehensive investigation of a number of items including (1) possible additions to the Appendixes of Method E 142 in an analytical form to permit extension of the existing table in the basic document, (2) various mechanisms to determine unsharpness, (3) equivalence of materials, (4) penetrators for plastics and nonmetallics, and (5) comparison of wire and plaque types of penetrators to establish equivalent sensitivity.

Task Group G on Radiographic Illustrations of Equivalent Penetrator Sensitivities (H. R. Spletstosser, chairman)—Radiographs demonstrating the equivalent sensitivity which is obtainable under practical conditions were produced from ¼-in., 1-in., and 1½-in. thick steel plates. These radiographs show a variety of ASTM penetrators of the proper thickness to demonstrate visibility of the 1T and 2T holes. An array of "simulated penetrators" was also included to show the effects of photon randomness on the radiographic recording of information.

Initially, unexpected results were obtained from extensive work with Co-60 radiography which led to an investigation of the radiographically recorded scatter buildup factor. Radiographing steel with Co-60 involves the recording of the primary image forming radiation and the scattered non-image forming radiation. The recording of scatter can be reduced effectively, relative to recording of primary, by two means; (1) by the well-known preferential absorption of scatter using a lead filter between specimen and recording medium and (2) by the use of low-atomic number screens that discriminate against recording of scatter, compared to high Z screens, because of the relationship between photoelectric absorption and Compton absorption in the screens. Either of these techniques require an increase in exposure but give higher radiographic sensitivity. Part of the increase in exposure is a direct result of decreasing the non-image forming exposure recorded by the screen-film combination. However, a faster film may be used to advantage to compensate for the increased exposure.

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It is important that a person doing Co-60 radiography has enough knowledge of the factors involved to make an intelligent compromise between image quality and exposure. As a practical example, radiographs have been made which show that better radiographic sensitivity can be obtained with a lower exposure on Class II film and copper screens than on Class I film and lead screens.

Task Group H on Classification and Evaluation of Industrial X-Ray Films (J. Battema, chairman) is developing a final document on film classification. Work is still in progress to resolve differences related to possible recommended techniques to be included in a final draft of a proposed document.

Subcommittee II on References for Radiographic Interpretation (S. Goldspiel, chairman; R. W. Zillmann, secretary)—The progress reported below for the past year is for active task groups; the others were placed in an inactive status pending decision to revise the documents under their jurisdiction.

Task Group A on Modernization of Reference Radiograph Document E 71 (M. R. Rosumny, chairman)—The task group has the charge of updating the existing document, with emphasis on (a) development of actual plate castings to back up the illustrations for the references, and (b) inclusion of more discontinuity types now recognized in the field. The task group has completed its work and is now preparing 5 sets of prototype albums and associated text material for use in a forthcoming ballot within Subcommittee II.

Task Group B on Reference Radiographs for Aluminum and Magnesium Castings (J. P. Battema, chairman) was reactivated last year and given the assignment to develop reference radiograph illustrations for segregation types in magnesium alloy castings, which have heretofore not been adequately covered but which are now considered of importance by a large segment of the industry. Work on $\frac{1}{4}$ and $\frac{3}{4}$ -in. plate castings with appropriate discontinuity indications is underway.

Task Group F on Reference Radiographs for Steel Fusion Welds (R. P. Meister, chairman) has completed its work, a three-volume document plus editorial material which have been approved at various levels as a new standard under designation E 390. ASTM

Headquarters has awarded a contract for the multiple reproduction of illustrations. The chairman has appointed a monitoring group which has prepared a specification for reproductions and will monitor the manufacture of the illustrations.

Task Group G on Guide to Interpretation of Radiographs of Semiconductor and Related Devices (R. McCullough, chairman) has completed a document containing sketches, terminology, and descriptions of most common representative conditions and defects encountered in the radiography of semiconductors and related devices. The document has been approved by a ballot within the task group and is currently undergoing ballot within Subcommittee II.

Task Group H on Reference Radiographs for Aluminum and Magnesium Die Castings (D. H. Kleepinger, chairman) is cooperating with Committee B-6 in developing radiographs for aluminum and magnesium die castings. Work on graded illustrations for gas porosity, shrinkage, inclusions, and cold fill in $\frac{1}{8}$ and $\frac{5}{8}$ -in. sections of each material is nearing completion. The task group expects to have all the castings and prototype radiographs completed by the June 1970 Annual Meeting.

Task Group J on Reference Radiographs for Heavy-Walled Cast Iron (T. E. Skorupa, chairman) is developing a supplement to existing reference radiographs for steel castings, which is needed for the evaluation of radiographs for important heavy-walled gray iron castings. After a considerable number of meetings and work by cooperative companies, the task group has decided to develop five graded severity levels of *feathery shrinkage*, the only type needed (in their judgment) to supplement illustrations contained in document E 71 for work on cast iron. The document will contain illustrations produced with three radiation source types commonly used by the industry, that is, Ir-192, Co-60, and 250 X-rays. The task group expects to complete the prototype, including text, by June 1970.

Task Group K on Reference Radiographs for Titanium Alloy Castings and Welds (M. Rosson, chairman; H. Nagler, vice-chairman)—During the 1970 ASTM Winter Meetings in Fort Lauderdale, the Committee E-7 Council authorized establishment of a

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task group on reference radiographs for titanium alloy castings and welds. The action was taken on good evidence, for the need of such documents, provided to Subcommittee II by several commercial and government leaders in the field. A good slate of representatives from various industry segments of leaders in the titanium field have indicated interest in the group. The task group should be organized for full-scale work by June 1970.

Monitoring of Reference Radiograph Document Production—With the growth of the number of documents and their increased use by industry, ASTM Headquarters has to contract for multiple reprints of various documents under the jurisdiction of Subcommittee II more frequently than heretofore. To assure consistently high-quality reproductions of illustrations, regardless of availability of personnel who worked on the originals, Subcommittee II took the following steps during the 1970 Mid-Winter Meetings: (a) Subcommittee II will provide ASTM Headquarters with a written specification for use in quality control; (b) the Subcommittee II chairman will provide designated personnel, representing the appropriate task group, to develop a prototype set of radiographs for each document and radiation source type for use by headquarters as quality assurance standard; and (c) as the need arises, knowledgeable personnel, drafted from appropriate task groups, will be sent by Subcommittee II to ASTM Headquarters to monitor new orders for documents.

Subcommittee III on Magnetic Particle and Penetrant Testing (J. Borucki, acting chairman)—The reference photographs for penetrant and wet magnetic particle inspection were resolved and documents, as amended, for both techniques were approved by a voice vote and subsequently were submitted to Committee E-7 for letter ballot.

The task group on reviewing existing standards has received several comments indicating that Standards E 109, E 125, and E 138 should be revised. Len Detlor, chairman of Task Group B on Penetrant Sensitivity, has indicated that a revision of Methods E 165, regarding sulfur and chlorine analysis, should be made before the ASME Section V specification is released. The E 165

document will be reviewed by the Standards Review Task Group before submission to Committee E-7 for letter ballot.

M. J. Placitella (replacing Richard Booth) is taking action to finalize the S & C Test Procedure using the Dohrman Microanalyzer.

Subcommittee IV on Nomenclature. (G. M. Corney, chairman) through its liaison members with other Committee E-7 subcommittees and with ASTM Committee E-8 has cooperated and advised on the preparation of ASTM glossaries. Major activity in Subcommittee IV will not start until this fall, upon publication of Part 33, the combined ASTM glossary. At that time it will be necessary for us to aid actively in one resolution of conflicts between E-7 definitions and those of other ASTM committees. The chairman of Subcommittee IV therefore respectfully requests the other E-7 subcommittee chairmen to keep their nomenclature task groups active.

Subcommittee VI on Ultrasonic Testing (J. E. Bobbin, chairman) completed another active year. Several sections had continuing projects, which are summarized below.

Section A on Glossary (R. R. Rowand, chairman)—The much-revised glossary of ultrasonic terms has been completed with 131 terms remaining. It is being ballotted by Subcommittee VI. Copies have been sent to Committee E-8 for inclusion in the master list.

Section B on Aluminum Reference Blocks (F. C. Panian, chairman) was reactivated to review Recommended Practice E 127 for possible changes required by recent material and equipment peculiarities. Work is progressing, and a draft of a revised recommended practice is now being prepared. Work also was initiated on the development of reference standards and procedures for compensating for the effect of curved entry surfaces in critical ultrasonic tests.

Section C on Straight-Beam Contact Test Methods (R. Hardison, chairman) is reactivated for the mandatory 6-year review of Recommended Practice E 114. Considerable revision is anticipated to make the existing document consistent with present industry practices which still include a substantial amount of ultrasonic testing by the contact method where standardization of technique

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would be helpful.

Section D on Resonance Test Methods (J. E. Bobbin, chairman) was reactivated to review and revise Recommended Practice E 113. Work is now in progress to update practices for ultrasonic testing by the resonance method.

Section E on Ultrasonic Weld Inspection (Levi Tarr, chairman)—The revised Recommended Practice E 164 is completed and was submitted to simultaneous balloting in Committee E-7 and Subcommittee VI. Results of this balloting are now being reviewed. Important renovations in the recommended practice for weld inspection are still being considered to meet the increasing demands of industry.

Section H on Test Standardization without Reference Blocks (C. E. Hohl, chairman) was established to study and prepare a draft of a recommended method for determining discontinuity sizes by referral to references other than test blocks. The discontinuity response could be identified as a percentage of block reflection signal as employed in DVG diagrams. A complete scope and work program is now being established for the new Section H.

Section I on Equipment Standardization (F. C. Panian, chairman)—Two task groups have been formed to expand the study means of determining certain parameters of instruments and of transducers by electrical measurement techniques. Work is under way to define specific characteristics of test instruments to be measured and the development of a recommended practice for measuring search-unit characteristics is still in progress.

Section J on Steel Reference Blocks (G. Ronca, chairman)—A much revised document was balloted in Committee E-7 and one negative vote was resolved. A final manuscript of the proposed document is now being prepared for final approval by the Society.

Section M on Material Properties (T. W. McFarlan, chairman)—Two task groups have been established. Round-robin tests of samples developed by one task group for measuring velocity are almost complete. Several alternate methods for measuring velocity have now been included. The second task group studying attenuation is continuing to collect data on measurement of true

attenuation for eventual inclusion in a first draft of a proposed document.

Section N on Castings Inspection (R. W. Zillmann, chairman)—No activity pending outcome of preliminary work now being conducted by Committee A-1, Subcommittee VIII.

Subcommittee VI also undertook the review of a document prepared by Subcommittee III of Committee B-7 covering the ultrasonic examination of aluminum alloy plate for pressure vessels. The review was directed primarily to the test procedure and not to the established acceptance limits.

Subcommittee VII on Electromagnetic Methods (P. C. McEleney, chairman) completed work on a proposed tentative recommended practice for electromagnetic testing of seamless and welded tubular products fabricated from austenitic stainless steel and similar alloys and submitted a final draft to Committee E-7 for approval by letter ballot. Results of this ballot are now being reviewed and will be included in a revised version to be submitted to the Society for final approval and adoption. Recommended Practices E 243 - 67 T and E 309 - 67 T were reviewed and submitted to Committee E-7 letter ballot for approval as a standard without revision. In recognizing the need for updating both documents during the next review period, work is being continued to develop necessary revisions.

Subcommittee VIII on Leak Testing (R. J. Roehrs, chairman, C. H. Voelker, secretary) is conducting the following activities:

Section A on Glossary (B. H. Clark, Jr., chairman) has completed Standard Definitions of Terms Relating to Leak Testing, which has been approved by Subcommittee VIII and has been submitted to Committee E-7 for approval by letter ballot.

Section B on Mass Spectrometer Leak Detection (Walton Briggs, chairman) has completed 3 of 5 portions of a proposed ASTM Standard: Vacuum Testing, Vacuum System Testing, and Vacuum Testing by Residual Gas Analyzer or by Mass Spectrometer Leak Detector Tube. Section B is working on Probe Testing and Bomb Testing.

Section C on Halogen Testing (John Roberts, chairman) has completed a Method for Testing for Leaks Using the Alkali-Ion Diode Leak Detector with Halogen Tracer Gas.

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This has been approved by Subcommittee VIII and has been submitted to Committee E-7 for ballot.

Section D on Liquid Penetrant Leak Testing (J. E. Rolfe, chairman) was established to prepare a recommended practice.

Section E on a Guide for Preparation of Leak Testing Specifications and Procedures (J. William Marr, chairman) was established to prepare a recommended practice for use by industry.

Section G on Semiconductors and Electronics (chairman to be appointed) was undertaken at the request of industry to explore what should be done by Subcommittee VIII.

Section H on Pressure Equipment (Harry Jackson, chairman) was formed to coordinate with the requirements of the ASME Boiler and Pressure Vessel Code.

Section F on Guide for Selection of Method (L. T. Detlor, chairman) is preparing a Guide for Selection of Leak Testing Method.

Subcommittee IX on Materials Inspection and Testing Laboratories (C. F. Robards,

chairman) is continuing its program to define minimum requirements and to develop recommended practices for evaluating capabilities of independent laboratories.

Task Group A (J. D. Fenton, chairman) completed a second draft of a proposed document defining responsibilities, minimum duties, and qualifications of personnel in non-destructive testing laboratories. The second draft was reviewed during the January 1970, meeting and numerous comments were accumulated and are now being incorporated into a third draft of a proposed recommended practice.

Task Group B (W. Thomas, chairman) developed terms and definitions related to various nondestructive testing methods. These items were included in the first draft of the recommended practice now being developed by Task Group A.

Respectfully submitted on behalf of the committee,

J. H. BLY,
Chairman

F. C. PANIAN,
Secretary

REPORT OF COMMITTEE E-8 ON NOMENCLATURE AND DEFINITIONS

Committee E-8 on Nomenclature and Definitions held meetings June 26, 1969, December 16, 1969, and April 14, 1970, at ASTM Headquarters, Philadelphia, Pa.

Glossary—The Glossary of ASTM Definitions, updated through 1968, is scheduled for publication late in 1970 in Part 33 of the *Annual Book of ASTM Standards*. Work is continuing on further updating of the Glossary.

Reduction of Duplication—An intensive effort is under way to reduce the number of definitions of a given term to a single basic definition, where one is adequate, with elimination of variations in wording only. Where several definitions of a term with significant differences are necessary for different uses of the term, more than one definition will have to be retained, but here also the number of definitions will be reduced as much as

feasible. In the process of reducing duplication, improvements in wording, where desirable, will be worked out with the technical committees concerned.

A large number of definitions from the technical committees were reviewed and comments submitted to them. These were reviewed to determine compliance with the guidelines.

The following officers have been elected for the two-year term from June 1970 to June 1972:

Chairman, F. W. Reinhart

Vice-Chairman, R. G. Ahlvin

Respectfully submitted on behalf of the committee,

F. W. REINHART,
Chairman

M. D. HUBER,
Secretary

REPORT OF COMMITTEE E-9 ON FATIGUE

Committee E-9 on Fatigue held one meeting during the year at Cincinnati, Ohio, on Dec. 9, 1969. The Executive, all eight subcommittees, and three of the task groups met at least once, in Cincinnati, Dec. 8-9, 1969, and/or at the ASTM Annual Meeting in Atlantic City, June 23 and 25, 1969.

The election of new members and a number of resignations brought the total committee membership to 127, five of whom are honorary members. Vice-chairman J. C. Grosskreutz resigned from his position to spend a year at the Max-Planck Institut, Germany, and was replaced by W. S. Hyler. The status of Subcommittee III on Survey was changed to that of a section of Subcommittee II on Papers.

A three-session Symposium on Achievement of High Fatigue Resistance in Metals and Alloys was held at the Annual Meeting. Two technical sessions related to fatigue and crack propagation in composites were held at the Cincinnati meeting. The Committee E-9 meeting at this time ended with talks by R. E. Johnson and J. Cammett on Some Aspects of Fatigue Failure Prevention in Aircraft Turbine Engines.

The proceedings of Symposia held in San Francisco, Calif., June 1968, and in Atlanta, Ga., October 1968, were published, the former as *STP 459, Fatigue at High Temperature*, and the latter as *STP 462, Effects of Environment and Complex Load History on Fatigue Life*. The Manual on Low-Cycle Fatigue Testing, prepared by Subcommittee VIII, has also been published as *STP 465*.

The following officers were elected by letter-ballot of Committee E-9 for the two-year period June 1970 to June 1972:

Chairman, H. F. Hardrath
Vice-Chairman, W. S. Hyler
Secretary, R. C. A. Thurston
Assistant Secretary, R. E. Little

ACTIVITIES OF SUBCOMMITTEES

Subcommittee I on Research (A. J. McEvily, chairman)—At the December 1969 meeting, this subcommittee sponsored an informal session at which a number of brief reviews of fatigue research in progress were presented and discussed. The subcommittee is cooperating with the ASME in sponsoring and planning a Symposium on Fatigue in the Creep Range, to be held at Storrs, Conn., June 1972.

Subcommittee II on Papers (W. S. Hyler, chairman)—In cooperation with Subcommittee V, this subcommittee has arranged one general session on fatigue and a two-session Symposium on Fatigue Crack Propagation and Damage Tolerance in Aircraft Structures for the 1970 Annual Meeting. It was agreed that publication of the Fatigue Bibliography would be discontinued. The section concerned with this activity will concentrate its efforts on disseminating knowledge on information retrieval to exploit existing sources of fatigue abstracts and data.

Subcommittee IV on Apparatus and Test Methods (H. S. Reemsnyder, chairman)—The three task forces constituted to develop recommended practices for dynamic calibration of fatigue testing machines, fatigue testing procedures, and fatigue data presentation and design of experiments, made good progress with their assignments. Draft recommendations from each task force will be discussed at the 1970 Annual Meeting.

An ISO draft proposal on dynamic calibration was examined by the subcommittee, found to be unsatisfactory, and returned for revision.

A session on fatigue testing methods and apparatus is being planned.

Subcommittee V on Aircraft Structural Fatigue Problems (M. S. Rosenfeld, chairman)—The Cincinnati meeting of this sub-

REPORT OF COMMITTEE E-9

committee featured two presentations on investigations of service fatigue failures and a discussion of the effective stress concentration of landed butt joints. Methods of monitoring fatigue damage and the problem of counting cycles were also considered.

In view of the interest in sophisticated closed-loop systems for testing full-scale structures, it was agreed to arrange an informal session on this topic for the Kansas City meeting, December 1970.

Subcommittee VI on Statistical Aspects of Fatigue (R. A. Heller, chairman) has appointed three task forces to consider and report on the statistical design of experiments, definitions and symbols for random fatigue, and confidence intervals. Progress reports were presented at the Cincinnati meeting.

The manuscript for the revision of *STP 91-A* is expected to be completed by the 1970 Annual Meeting, and will be up-dated by the use of the International System of Units.

Subcommittee VI is sponsoring a two-session symposium on the statistical evaluation of data, random loading, and fatigue reliability for the 1971 Annual Meeting.

The Atlantic City meeting concluded with an informal talk by J. Kao on Weibull Tolerance Limits for Fatigue Data.

Subcommittee VII on Contact Stress Fatigue (H. R. Neifert, chairman) agreed to carry out a round-robin program to evaluate five different bench rigs with regard to their ability to separate materials according to their ability to separate materials according to their respective contact fatigue resistances. Tests will be made on two heats of 52100 steel of different quality. Standardization of the test conditions should be completed by June 1970, when specimens from the first heat will become available.

The subcommittee is cooperating with the ASME Research Council on Lubrication in an investigation of the effect of lubricant chemistry on contact fatigue resistance.

Subcommittee VIII on Fatigue under Cyclic Strain (L. F. Coffin, chairman) cosponsored and several members participated in a Symposium on Cyclic Stress-Strain Behavior held at the ASME Winter Meeting, November 1969.

An informal session on Cyclic Stress-Strain Analysis was held at the Cincinnati meeting, and ten papers were presented. It was agreed that a formal symposium should be planned for a forthcoming ASTM Meeting.

The subcommittee meeting in Toronto, June 1970, will consist of an informal session on electro-hydraulic machines operating under closed-loop control for low-cycle fatigue testing.

Task Group on the Manual on Fatigue Testing (S. M. Marco, chairman)—Editing required for the proposed revision of *STP 91* proved to be more extensive than was originally expected, and this task has consequently not yet been completed.

Task Group on Fatigue under Random Loading (S. R. Swanson, chairman)—Definitions and nomenclature related to random load fatigue and random process statistics were the principal topics discussed at the Atlantic City meeting. This task group was subsequently assimilated into Subcommittee VI.

Task Group on Influence of Environment (D. W. Hoepfner, chairman)—A draft manuscript of a state-of-the-art review of the influence of environment on fatigue properties should be completed by the 1970 Annual Meeting.

Task Group on Fatigue of Composites and Nonmetallics (J. D. Marble, chairman) plans to meet in Toronto, June 1970, and two technical presentations have been arranged.

Respectfully submitted on behalf of the committee,

H. F. HARDRATH,
Chairman

R. C. A. THURSTON,
Secretary

Committee E-10 on Radioisotopes and Radiation Effects held three meetings during the year: in Denver, Colo., on Feb. 5, 1969; in Atlantic City, N. J. on June 25, 1969; and in Cincinnati, Ohio on Dec. 10, 1969. The committee consists of 128 voting members and 49 consulting members.

Subcommittee E-10.2 on Radiation Induced Changes scheduled E-10's 5th International Conference on the Effects of Radiation on Structural Metals during ASTM's Annual Meeting in Toronto, Canada, but because of foreign travel restrictions, it has been rescheduled for Niagara Falls, USA/Canada, June 29 to July 1, 1970. Twenty papers from foreign countries and 27 papers from the U.S. are scheduled to be presented at six sessions. It is planned to publish the proceedings of these symposia as has been done in the past. See *ASTM STP 457, Irradiation Effects in Structural Alloys for Thermal and Fast Reactors*.

of E-10 for the remainder of the term.

Chairman, D. N. Sunderman
First Vice-Chairman, L. E. Steele
Second Vice-Chairman, M. M. Turkanis
Liaison Officer, A. L. Bement
Secretary, R. C. Shank

Subsequent to the 1969 annual report, Committee E-10 presented to the Society through the Committee on Standards the following recommendation, which was accepted effective on Dec. 19, 1969:

E 393 - 69 T, Methods for Measuring Fast-Neutron Flux for Analysis for Barium-140 Produced by Uranium-238 Fission (Subcommittee E-10.5) (effective Dec. 19, 1969)

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

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Tentatives Adopted as Standard Without Revision:

- E 262 - 70** (formerly E 262 - 65 T), Method for Measuring Thermal Neutron Flux by Radioactivation Techniques (Subcommittee E-10.5) (effective Feb. 27, 1970)
- E 263 - 70** (formerly E 263 - 65 T), Method for Measuring Fast-Neutron Flux by Radioactivation of Iron (Subcommittee E-10.5) (effective Feb. 27, 1970)
- E 264 - 70** (formerly E 264 - 65 T), Method for Measuring Fast-Neutron Flux by Radioactivation of Nickel (Subcommittee E-10.5) (effective Feb. 27, 1970)
- E 265 - 70** (formerly E 265 - 65 T), Method for Measuring Fast-Neutron Flux by Radioactivation of Sulfur (Subcommittee E-10.5) (effective Feb. 27, 1970)
- E 266 - 70** (formerly E 266 - 65 T), Method for Measuring Fast-Neutron Flux by Radioactivation of Aluminum (Subcommittee E-10.5) (effective Feb. 27, 1970)

Tentative Adopted as Standard with Editorial Revision:

- E 261 - 70** (formerly E 261 - 65 T), Method for Measuring Neutron Flux by Radioactivation Techniques (Subcommittee E-10.5) (effective Feb. 27, 1970)

This method was editorially revised to bring it into agreement with the latest technical information.

Revision of Standards:

- E 185 - 70** (formerly E 185 - 66), Recommended Practice for Surveillance Tests for Nuclear Reactor Vessels (Subcommittee E-10.2) (effective July 15, 1970)

The standard was revised to conform to current practice.

All of the above revised standards appear in the 1970 *Annual Book of ASTM Standards*, Part 30, except for E 185 - 70 which will appear in the 1971 *Annual Book of ASTM Standards*, Part 30.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee E-10.1 on Fuel Burnup (B. F. Rider, chairman) has been preparing methods for determination of atom percent fission in nuclear fuel based either on changes in heavy element isotopic composi-

tion resulting from neutron irradiation or on a fission product-to-fuel ratio in neutron-irradiated fuel. Recent efforts of the subcommittee have been directed toward preparation of methods for selected fission products such as Neodymium-148, Cesium-137, total fission-product technetium, and total fission-product zirconium, as well as methods for two nuclear fuels of interest, uranium and plutonium.

Round-robin testing for both Method E 267, Mass Spectrometric Determination of Uranium and Plutonium Concentrations and Isotopic Abundances, and Method E 320, Radiochemical Determination of Cesium-137 in Nuclear Fuel Solutions has just been completed. These two methods have been submitted to Committee E-10 for balloting for adoption as standard. A Method for Colorimetric Determination of Technetium has been completed and is ready for balloting by Committee E-10 for approval as tentative. A method for determination of zirconium is in preparation.

Plans are made to write a method for nondestructive measurement of burnup by means of a Ge(Li) detector. Also, it is planned to prepare methods for determining plutonium to serve as alternates to mass spectrometry.

Subcommittee E-10.2 on Radiation Induced Changes in Metallic Materials (J. Moteff, chairman) met at the ASTM Atlantic City and Cincinnati Meetings in June and December, 1969, respectively.

Final plans were completed for the Fifth International Symposium on Radiation Effects to Structural Metals to be held in Niagara Falls, Ontario, Canada, during June 29 to July 1, 1970. This symposium will have two sessions on Pressure Vessel Steels, one on Thermal Reactor Materials and three on Fast Reactor Materials. Special discussion sessions will consider the (1) Structure and Composition Effect on Irradiation Sensitivity of Pressure Vessel Steels, and (2) Swelling of Austenitic Stainless Steels in Fast Reactor-Experimental Evidence, Design Considerations and Possible Methods of Solution.

Section A on Core and Cladding is completing the initial draft of a Recommended Practice for Detailed Examination of Fuel Elements. During the course of the revision of Recommended Practice E 184, for Ef-

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fects of High-Energy Radiation on Mechanical Properties of Metallic Materials, it was apparent that other related recommended practices are needed. These included areas such as (1) the physical inspection of control rods and control-rod cladding, and the determination of their structural integrity following removal from the reactor, (2) the specification pertaining to the additions of rare earth elements in alloys to be used in fast reactor cladding, and (3) the problems associated with cladding performance in Isotopic Source Power Systems. Other areas to be considered are related to LMFBR type fast flux, high fluence, and elevated temperature reactor environment with the concomitant clad and structure dimensional stability (swelling) and changes in mechanical properties. This will include the selection of a neutron energy dependent radiation effects parameter which will most likely be different for each property being considered.

Section B on Noncore Structures has completed work on the revision of Recommended Practice E 185 for Surveillance Tests on Structural Materials in Nuclear Reactors. Work is progressing on practices in technical areas, such as In-Service Annealing, In-Service Inspection, Surveillance Testing for High-Temperature Application, and Effects of Neutron Irradiation on Fracture Properties of Metallic Materials. Liaison and procedures are being worked out in obtaining from the AEC Heavy Section Steel Technology (HSST) Program correlation monitor material for use with ASTM Recommended Practice E 185.

Subcommittee E-10.3 on Tracer Applications and Activation Analysis (E. E. Wicker, chairman) met only once during the year, but nevertheless it was a year of progress. The first draft of a tentative method for the Forensic Comparison of Paint Specimens via Instrumental Neutron Activation Analysis was initiated. The timeliness of this activity is evidenced by the formation of a steering committee to establish an ASTM Committee on Analysis of Physical Evidence in Forensic Science. Subcommittee E-10.3 is, of course, represented on this steering committee.

Additionally, Subcommittee E-10.3 cooperated in the dissemination of information regarding a survey of the needs for radioactivity standards being made for the Na-

tional Academy of Sciences. Other fields of activity for the subcommittee are under consideration and should show some positive results in 1970.

Subcommittee E-10.4 on Measurements Using External Radiation Sources (W. G. Gunderman, chairman)—A questionnaire was circulated to members regarding interest in subcommittee activities and membership was reduced accordingly.

Section A on Hydrogen and Density Testing has a task force working on calibration methods for density and moisture content.

Committee D-4, Sub-2b, has appointed a task force to work with Subcommittee E-10.4, Section A, on a method for density of bituminous mixes.

A proposed standard for density of soil and related materials has been balloted by Committee D-18.

Future plans include continued pursuit of soils and bituminous methods until they are adopted as standards with a frequent evaluation of other areas of possible need such as self luminous signs, pavement thickness measurement, etc.

Subcommittee E-10.5 on Neutron Dosimetry (C. Z. Serpan, Jr., chairman)—The most important work accomplished by the subcommittee during 1969 was the adoption as standard of six tentatives describing procedures for measurement of neutron flux by radioactivation techniques. These were covered under the designations E 261 - 65 T through E 266 - 65 T and included procedures for important thermal and fast neutron flux detector materials. Concurrently, a new tentative Method E 393 - 69 T, for Measuring Fast Neutron Flux for Analysis for Barium-140 Produced by Uranium-238 Fission was accepted by the Society. These standards constitute a coherent body of technology for use in determinations of neutron flux density.

Four additional documents are ready to be balloted by the subcommittee and Committee E-10 as well. These are as follows:

(1) Discussion of Computer Codes for Determining Neutron Flux Spectra by Multiple Foil Measurements, to be included in the Related Materials section of the *Annual Book of ASTM Standards*, Part 30 for two years for comments. This area of spectral determination is too important to ignore, but

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too young and controversial for precise definition with ASTM Committee E-21. Definition.

(2) Fast-Neutron Flux Measurements by Track-Etch Techniques, provides a means for "stable-product-type" neutron measurements wherein the activated constituent does not lose activity with time.

(3) Tentative Method for Measuring Neutron Flux from $H^2(d,n)He^3$ Neutron Generators by Radioactivation of Copper—This method will have considerable application for dosimetry at accelerators.

(4) Guide for Selection of Neutron Activation Detectors—The more important considerations involved with selection of specific materials for specific irradiations are noted.

Two important new standardization activities are underway. First, a method is being written for establishment of flux and fluences from irradiations in reactors wherein the power level is not uniform. This is of particular importance for measurements in power reactors where the operations often must fluctuate between high and low power demands. The second activity is to write a method for determination of thermal flux using cobalt and silver as the neutron detector materials. This method has great potential for future application since it eliminates the need for a cadmium shield as previously used in the "cobalt bare and cadmium-cobalt covered" technique. This method was of limited value in elevated temperature irradiations.

Twelve subcommittee members are working under the leadership of Ray Barrall at Stanford University in a project to update and evaluate the cross section values for about 50 different reactions of high interest to the neutron flux dosimetry for reactor radiation experimentation. This effort will complement those of the Brookhaven Sigma Center and the Evaluated Nuclear Data File.

Subcommittee E-10.6 on Space Radiation Effects (John Romanko, chairman; Wm. B. Rose, Cochairman)—The main activity of this subcommittee during 1969, was the planning and successful conduct of a Symposium on Coatings in Space which was held on Dec. 11 and 12, 1969, at the Netherland-Terrace, Hilton Hotel, in Cincinnati, Ohio, in conjunction with the 1969 ASTM Winter Meeting. This symposium was cosponsored by Subcommittee E-10.6 and NASA, in co-

effects of space radiations (pulsed or steady state), especially indigenous space radiations including Van Allen belt electrons and protons, on coating materials were highlighted. The materials included thermal control coatings, paints, reflective coatings, protective covers, windows, and conformal coatings, but excluded thin-film devices. After a keynote address and an invited paper on the low energy components of the space environments, three sessions were offered. Session I and II, on Thermal Control Coatings, opened with an invited tutorial on the subject matter in question, which was followed by contributed papers. Session III, a forum or round-table discussion, highlighted novel experimental techniques currently used in studying radiation effects on surfaces as presented by participant panel members; these were followed by discussions from the floor with audience participation.

Meetings were held both in Atlantic City, N. J., during the 72nd Annual Meeting of the Society and in Cincinnati, Ohio, during the December Committee Week. One of the chief topics of concern at these meetings was, of course, the planning of the above mentioned Subcommittee E-10.6/NASA cosponsored Symposium on Coatings in Space.

Sections A and C did not meet formally at either of the two meetings mentioned in order that the respective section chairmen as members of the symposium committee might devote themselves exclusively to the preparation of events concerning the symposium. *Section A on the Space Environments* has just recently been reorganized under new chairman Art Reets, Jr. *Section C on Vacuum-Radiation Effects* remains somewhat inactive pending appointment of a new chairman.

Section B on Indigenous Space Radiation Effects met in San Francisco, Calif., in June 1968, under Cochairman L. B. Fogdall. The main activity arising from this meeting was the assignment of Mr. Babjak to coordinate with the ASTM D committees on paints and elastomers, regarding the best ways to proceed in writing specifications on thermal control paints. Section B also held an ASTM luncheon in Los Angeles as part of the 1968 AIAA Conference. This luncheon was invaluable in providing a forum for presenta-

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tion of the latest information on thermal-control coatings. It also served to keep ASTM activities coordinated in an AIAA atmosphere.

Section D on Temperature-Radiation Effects met in Atlantic City, N.J., under chairman J. R. Coombe. A discussion was held relative to determining papers for a Workshop on Cryogenic Irradiation Effects planned for the 73rd Annual Meeting in 1970. Papers on a summary of titanium irradiation data, on aluminum, and on fatigue were volunteered previously by Lewis Research Center. Various methods of organizing papers into sessions considered were: a session of the Symposium on Effects of Radiation on Structural Metals; a session of Fracture Toughness Testing at Cryogenic Temperatures; and a workshop session or colloquium. Section D secretary, Eugene Dixon, was designated liaison contact with the Committee E-10.2 symposium chairman on the International Symposium on the Effects of Radiation on Structural Metals to be held in Niagara Falls during the week following the 73rd Annual Meeting in June 1970.

Section E on Pulsed Radiation Effects and Section F on Electronic Components and Modules met in conjunction with the IEEE Annual Conference on Nuclear and Space Radiation Effects on July 8, 1969, at Pennsylvania State University, University Park,

Pa., under Chairman R. S. Shane. The highlight of this meeting was the continuation of the informal colloquium series initiated in the previous meetings at Detroit and Boston, which are bringing to the fore problems and solutions in the areas of steady-state and pulsed-radiation effects testing which will ultimately lead to the writing of specifications and recommended practices. Sections E and F also met in Cincinnati, Ohio, in December 1969, to discuss the following items:

(1) Proposed Tentative Method for Determining Neutron Fluence in Units of 1 MeV Equivalence for Silicon Bulk Damage,

(2) Simulation of accelerated testing by rapid energy implantation using controlled radiation sources,

(3) Updating and reissue as an ASTM Standard the IEEE Guide for Classifying Electrical Insulating Materials Exposed to Neutron and Gamma Radiation, and

(4) Section E and F meetings planned for 1970 through 1971.

Section chairmen are developing their respective two and five-year plans for section activities, with reports due at the 73rd Annual Meeting in June 1970.

Respectfully submitted on behalf of the committee,

D. N. SUNDERMAN,
Chairman

R. C. SHANK
Secretary

REPORT OF COMMITTEE E-11 ON STATISTICAL METHODS

During the year 1969, Committee E-11 on Statistical Methods met twice at ASTM Headquarters in Philadelphia, Pa.: once on April 16 and again on November 19. The Executive Committee met on April 15 and November 18.

Membership—D. C. Chambers, University of Tennessee, and C. E. Makepeace, Atomic Energy of Canada Limited, were added to the committee as regular members. K. H. Kramer was appointed liaison representative of Committee E-3. H. J. LaDue (D-6) and C. H. Fuchs (D-12) no longer represent these committees for liaison purposes. C. H. Bubb replaced T. W. Lashoff for Committee D-6, G. B. Moore succeeded W. V. Friedlander for C-17 and Mary T. Dunleavy now represents D-20 in place of W. Reed Smith, Jr. (who continues as a regular member of E-11). At the end of the year, Committee E-11 had 26 regular members and 4 honorary members.

Committee Projects—The Ad Hoc committee of Committee E-11 continued its work with Committee E-15 on Analysis and Testing of Industrial Chemicals with respect to procedures for sampling industrial chemicals. Recommended Practice E 300-69, under the joint jurisdiction of Committees E-15 and D-16, currently contains a section on Statistical Considerations and includes statistical procedures for estimating the average quality of a lot and for acceptance sampling for a lot mean when basic variances are unknown. An additional part on sampling lots from a stream of batches, titled Acceptance Sampling for the Mean of a Lot for which the Basic Variance has been Previously Estimated, has been approved by Committee E-15. It awaits similar approval by Committee D-16 before addition to Recommended Practice E 300.

Personnel Changes—None. All officers

and members of the Executive Committee continued unchanged.

Special Honors—W. Edwards Deming received the Award of Merit "for his personal efforts and his national and international leadership in advancing the art and science of statistical sampling."

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee E-11 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which became effective on the dates indicated:

Revision of Standard:

E 141-69 (formerly E 141-61), Recommended Practice for Acceptance of Evidence Based on the Results of Probability Sampling (Subcommittee V) (effective Sept. 19, 1969)

Reapproval of Standard:

E 105-58 (1970), Recommended Practice for Probability Sampling of Materials

Permission was received to continue E 177-68 T, Tentative Recommended Practice for the Use of the Terms Precision and Accuracy as Applied to Measurement of a Property of a Material, for another year, so it could appear in the 1970 *Annual Book of ASTM Standards*.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee I, Editorial (F. E. Grubbs, chairman)—Work was completed on the editorial revision of Recommended Practice E 141-61, for Acceptance of Evidence Based on the Results of Probability Sam-

REPORT OF COMMITTEE E-11

pling. This revision was approved by E-11 and accepted by the Society for publication as Recommended Practice E 141 - 69.

Subcommittee II, Sampling of Bulk Materials (M. Lerner, chairman)—continued its work with the ad hoc committee which is preparing a standard for the sampling of industrial chemicals (see above). J. Visman (Department of Energy, Mines and Resources, Canada) talked to the subcommittee about his theory of sampling. An ad hoc committee was appointed to study this.

Subcommittee III on Sampling and Quality Control (C. A. Bicking, acting chairman) reviewed Recommended Practice E 105 - 58, Probability Sampling of Materials, and approved submission to E-11 ballot for re-approval without change. Recommended Practice E 122 - 58, Choice of Sample Size to estimate the Average Quality of a Lot or Process, is being revised by an ad hoc task group to bring terminology and symbols into line with current practice.

Subcommittee IV on Planning Test Programs (G. Wernimont, chairman)—The planned work on writing "Guidelines for the Development of a Testing Procedure" by Task Group I has been delayed because the

experimental program in Committee D-20, expected to provide the necessary data, was terminated. Task Group II on Material Behavior will cooperate where possible in a proposed E-24 study of the statistical aspects of brittle fracture.

Subcommittee V on Analysis of Data (E. C. Harrington, Jr., chairman) continued its study of Recommended Practice E 177 - 68 T, Use of the Terms Precision and Accuracy as Applied to Measurement of a Property of a Material, with the objective of adopting this tentative as standard. Subcommittee V has been requested to cooperate with Committee D-22 on the statistical aspects of the later's work on Sampling and Analysis of Atmospheres.

Subcommittee VI on Statistical Nomenclature and Definitions (E. M. Schrock, chairman)—A second draft of definitions of a number of statistical terms is being balloted by the subcommittee.

Respectfully submitted on behalf of the committee,

W. P. GOEPFERT,
Chairman

R. J. SOBATZKI,
Secretary

REPORT OF COMMITTEE E-12 ON APPEARANCE OF MATERIALS

Committee E-12 on Appearance of Materials held three meetings during the year: in September 1969 in Philadelphia, Pa., in December 1969 in Cincinnati, Ohio, and in June 1970 in Toronto, Canada.

The committee has continued its close cooperation with Standards Committees functioning under the procedures of the American National Standards Institute, the Inter-Society Color Council, the Illuminating Engineering Society, other ASTM committees in areas of appearance specification and measurement, and the United States National Committee of the Commission Internationale de L'Eclairage.

The committee consists of 57 members and 25 consultants.

The committee has sponsored the publication of *STP 475, Nomenclature and Definitions Applicable to Radiometric and Photometric Characteristics of Matter*.

The committee sponsored a symposium given during the 1970 ASTM Annual Meeting, *New Frontiers in the Measurement of the Appearance of Materials*. The following papers were given:

W. N. Hale, "Future Developments in the Use of Visual Color Standards in Color Quality Control Work"

Ruth Johnston and George Defresne, "Goniocolorimetric Measurements"

E. I. Stearns, "The Future Role of the Computer in Appearance Evaluation"

Henry Hemmendinger, L. W. Engdahl, and L. C. C. Noyes, "The Colors of Fluorescent Materials in Various Sources"

Fred Simon, "Teaching Color Science to Undergraduates, Graduates, and Post-Graduates"

L. F. C. Friele, "Color Difference and Color Tolerance Evaluation: Problems and Outlook"

The symposium was followed by an open

forum discussion in which an internationally known panel of experts participated.

The committee has sponsored a Special Technical Publication in which is contained the papers given during the 1968 Symposium on Appearance of Metallic Surfaces.

Secretary W. A. Coppock has resigned. A. J. Blanc accepted an interim appointment as secretary.

The following officers were elected to serve for the next two years:

Chairman, H. K. Hammond III

Vice-Chairman, C. G. Leete

Secretary, A. J. Blanc

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee E-12 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which became effective on the dates indicated:

Reapproval of Standards:

E 166 - 63 (1970), Recommended Practice for Goniophotometry of Transmitting Objects and Materials

E 167 - 63 (1970), Recommended Practice for Goniophotometry of Reflecting Objects and Materials

AMERICAN NATIONAL STANDARDS

All of the standards of Committee E-12 have been approved during the year as American National Standards by the American National Standards Institute, as follows:

E 97 - 55 (1965); ANSI Z172.1-1969, Test for 45-deg, 0-deg Directional Reflectance of Opaque Specimens by Filter Photometry

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- E 166 - 63;** ANSI Z172.2-1969, Rec. Practice for Goniophotometry of Transmitting Objects and Materials
- E 167 - 63;** ANSI Z172.3-1969, Rec. Practice for Goniophotometry of Reflecting Objects and Materials
- E 179 - 66;** ANSI Z138.3-1969, Rec. Practice for Selection of Geometric Conditions for Measurement of Reflectance and Transmittance
- E 259 - 66;** ANSI Z138.4-1969, Rec. Practice for Preparation of Reference White Reflectance Standards
- E 284 - 67;** ANSI Z138.1-1969, Def. of Terms Relating to Appearance of Materials
- E 306 - 66;** ANSI Z172.4-1969, Absolute Calibration of Reflectance Standards
- E 308 - 66;** ANSI Z138.2-1969, Rec. Practice for Spectrophotometry and Description of Color in CIE 1931 System
- E 312 - 66;** ANSI Z172.5-1969, Rec. Practice for Description and Selection of Conditions for Photographing Specimens
- E 313 - 67;** ANSI Z172.6-1969, Test for Indexes of Whiteness and Yellowness of Near-White Opaque Materials

ACTIVITIES OF SUBCOMMITTEES

Subcommittee I on Inter-Committee Relations (B. W. Preston, chairman) continues to report on appearance-related activities in other ASTM committees through the co-operation of their representatives in Committee E-12. The review of appearance methods of test prepared by other ASTM committees and other organizations continues.

Subcommittee III on Pictorial Representations (W. N. Hale, chairman) has completed a review of ASTM methods of test and recommended practices wherein appearance attributes are controlled by visual representation rather than by instrumental techniques. Progress is reported on the drafting of a recommended practice on the preparation and use of visual standards.

Subcommittee IV on ANSI and ISO Relationships (W. J. Kiernan, chairman) has been reviewing and offering comments on appearance related methods of test under study in American National Standards Institute and ISO task committees.

Task Group 4 on Appearance of Metallic

Surfaces (Erik Barkman, chairman) has prepared two methods for letter ballot of the committee: (1) Method of Test for Determining Gloss of High Gloss Metallic Surfaces by Goniophotometry, or Abridged Goniophotometry, and (2) Method of Test for Measurement and Calculation of Reflecting Characteristics of Metallic Surfaces Using Integrating Sphere Instruments.

Task Group 7 on Definitions of Appearance Characteristics of Objects and Materials (H. K. Hammond III, chairman) has revised and prepared new definitions for letter ballot in the committee. The group has cooperated with several national and international organizations in order to gain common recognition of radiometric and photometric definitions and terms.

Task Group 8 on Method of Test for Whiteness and Components of Whiteness of Materials (R. S. Hunter, chairman) has been revising the appendix in E 313, Indexes of Whiteness and Yellowness of Near-White Opaque Materials, in order to include new ideas of interrelated formulae now under development in several European countries.

Task Group 9 on Combining and Updating ASTM Methods D 307 and D 791 (G. W. Ingle, chairman) has been devoting its efforts to obtain international recognition of Recommended Practice E 308, for Spectrophotometry and Description of Color in the CIE 1931 System. The group is now considering the broadening of this practice to include the CIE 1964 System, the D6500 illuminant, improved description of colorimetry practices, new definitions and terms, and improved calibration procedures.

Task Group 10 on Reference White Standards (H. K. Hammond, chairman) is revising Method E 306, for Absolute Calibration of Reflectance Standards, to eliminate possible systematic errors in measurement.

Task Group 11 on Solar Transmittance and Reflectance (H. K. Hammond, III, chairman pro tem) has completed several extensive round-robin studies. The group is now preparing methods including the Spectrophotometric and Pyrheliometer Black-Box techniques with sections on transmittance and reflectance. The progress in the group could not have occurred without the devoted attention of A. C. Webber.

REPORT OF COMMITTEE E-12

Task Group 12 on Computer Programs for Appearance Measurement (C. G. Leete, chairman) is now revising a questionnaire in preparation for a more extended survey in and outside the ASTM perimeter of activities.

Respectfully submitted on behalf of the committee,

W. J. KIERNAN,
Chairman

A. J. BLANC,
Secretary

REPORT OF COMMITTEE E-13 ON MOLECULAR SPECTROSCOPY

Committee E-13 on Molecular Spectroscopy met twice during the year: in New York, N.Y., on Nov. 19, 1969, in conjunction with the Eastern Analytical Symposium, and in Cleveland, Ohio, on March 2, 1970, in conjunction with the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy. The committee plans to meet at the same conventions in November 1970 and March 1971.

The membership of Committee E-13 is not required to be classified as to producer, consumer, or general interest. There are presently 82 voting members of the committee.

The publications sponsored by the committee and published by the Society are as follows:

Manual on Recommended Practices in Spectrophotometry, Third Edition

Molecular Formula List of Compounds, Names and References to Published Infrared Spectra (AMD 31)

Serial Number List of Compound Names and References to Published Infrared Spectra (AMD 32)

Infrared Spectral Index on Magnetic Tape (AMD 33)

Alphabetical List of Compound Names, Formulae, and References to Published Infrared Spectra (AMD 34)

SIRCH-III, the ASTM/DOW Infrared File Search System (AMD 35)

Infrared Name-Formula Index on Magnetic Tape (AMD 36)

The committee is pleased to have recognition of Wescott C. Kenyon by selection to receive the ASTM Award of Merit in recognition of his distinguished service to the Society. Mr. Kenyon is continuing as vice-chairman of Committee E-13 and as chairman of Subcommittee E13.03 on Reference Data.

W. P. Tyler has retired as chairman of

Subcommittee E13.04 on Nomenclature and E. G. Brame, Jr. has retired as chairman of Subcommittee E13.07 on Nuclear Magnetic Resonance Spectroscopy. The new chairmen of these subcommittees are G. C. Dehne and T. C. Farrar respectively.

An election for officers was held by letter ballot and the following were elected for two-year terms beginning July 1, 1970:

Chairman, R. T. O'Connor

Vice-Chairman, W. C. Kenyon

Secretary, R. A. O'Dell

Members-at-Large, H. Foster and E. J. Rosenbaum.

The Executive Committee will consist of the above and the chairmen of the subcommittees.

The committee approved by letter ballot without negatives to drop Terms and Symbols relating specifically to NMR Spectroscopy from E 131-68. This Standard is under the jurisdiction of Subcommittee E13.04 on Nomenclature. This action avoids unnecessary duplication since all of these terms are now included in E 386-69 T.

AMERICAN NATIONAL STANDARDS

The Executive Committee of Committee E-13 has recommended taking a letter ballot of the committee to submit all of the standards under its jurisdiction (but not tentatives) for approval as American National Standards.

ACTIVITIES OF SUBCOMMITTEES

All subcommittees met in conjunction with the Pittsburgh Conference in Cleveland, March 1970, unless otherwise noted.

Subcommittee E13.01 on Apparatus Specifications (Kermit Whetsel, chairman) is working on the development of methods of test for resolution of spectrophotometers, improved definitions and symbols for terms related to spectral resolution, and improved

REPORT OF COMMITTEE E-13

photometric standards for spectrophotometry. The subcommittee has reviewed and approved a Method of Test for Measuring Linearity of Fluorescence Measuring Systems that was developed by Subcommittee E13.06 on Molecular Fluorescence.

Subcommittee E13.02 on Methods (H. A. Barnett, chairman) continues to have as its two main areas of activity the review of methods involving molecular spectroscopy and the preparation of recommended practices for different areas of molecular spectroscopy. Mrs. Concetta Paralusz was recently appointed as chairman of the task group for preparing recommended practices for reflectance measurements.

Subcommittee E13.03 on Reference Data (W. C. Kenyon, chairman) reports that during the past year over 8700 infrared spectra have been coded as to band location as well as to chemical structure. Those completed plus those in process of being coded, key-punched, and verified pave the way for the 14th and 15th supplements of the infrared spectral indexes.

The subject of a new format for coding high quality spectra was discussed at some length, and finally several people agreed to serve on a task group to start an initial effort to design this format. This task group will consist of R. S. McDonald, chairman, R. R. Hampton, A. Savitzky, E. Singer, and Clara D. Smith. They will try to have a preliminary report by November 1970.

It was announced that ASTM and Sadtler Research Laboratories were cooperating in trying out an experimental time-sharing system for searching the E-13 data on infrared spectra. After some discussion, the following resolution was passed by an unanimous voice vote of the subcommittee:

"The subcommittee (E13.03) recommends that any contract with any time-sharing vendor using the *E-13 infrared spectral data base* be not made so exclusive that other contracts with other time-sharing services could not be made. This data base should be available to any time-sharing service on an equitable royalty basis." The resolution was presented to the committee which voted to transmit it to the Society.

Subcommittee E13.04 on Nomenclature

(W. P. Tyler, retiring chairman) reviewed the nomenclature aspects of proposed methods under the jurisdiction of Subcommittees E13.06 on Molecular Fluorescence and E13.07 on NMR. It received the resignation of W. P. Tyler and, under its new chairman, G. C. Dehne, is proceeding to improve the consistency of terms, symbols, and definitions as they relate to Society usage. Many thanks were extended to W. P. Tyler for his extensive contributions.

Subcommittee E13.05 on Publications (M. G. Mellon, chairman) met as a very small group who remain available for editing any manuscripts which are contributed by the other subcommittees.

Subcommittee E13.06 on Molecular Fluorescence (Mrs. M. G. Filbert, chairman) met on April 15, 1970, in Atlantic City in conjunction with the Federation of American Societies for Experimental Biology (FASEB). It reviewed drafts of the method of test for minimum detectable fluorescence and of revised definitions of terms used in fluorescence spectroscopy. The method of test for linearity was submitted to Subcommittee E13.01 on Apparatus Specifications for review. A letter ballot by Committee E-13 should take place this year.

Subcommittee E13.07 on Nuclear Magnetic Resonance Spectroscopy (E. G. Brame, Jr., retiring chairman) met on April 22, 1970, in Pittsburgh, Pa., in conjunction with the Conference on Experimental Aspects of NMR (ENC). Reports were received from the task groups on Referencing Standards and Nomenclature; on Data Storage and Retrieval; on Pulse and Wideline; on Computer Applications; on Publicity; on Double Resonance; and on Analytical Methods.

Announcement was made that Dr. T. C. Farrar of the National Bureau of Standards will take over as chairman of the subcommittee. Appreciation was extended to Dr. Brame who will continue as a member.

Respectfully submitted on behalf of the committee,

R. T. O'CONNOR,
Chairman

R. A. O'DELL,
Secretary

REPORT OF COMMITTEE E-14 ON MASS SPECTROMETRY

Committee E-14 on Mass Spectrometry sponsored the Seventeenth Annual Conference on Mass Spectrometry and Allied Topics held in Dallas, Tex., May 18 to 23, 1969. A total of 644 persons attended the conference. The technical program consisted of 176 papers grouped into 20 half-day sessions, including special invited-paper symposia as follows:

Ionization Cross-Sections, arranged by L. J. Kieffer

Collisions of Electronically Excited Atoms and Molecules, arranged by E. E. Muschlitz, Jr.

Thermal Analysis, arranged by R. S. Gohlke and H. G. Langer.

Committee E-14 and most of its subcommittees held annual meetings during the week of the conference. There were numerous additional sessions of task groups, including task groups of Committee D-2 on Petroleum and Petroleum Products that elected to hold their meetings in conjunction with the conference.

With prior approval of the Board of Directors of ASTM following recommendation of the executive committee of E-14, a motion was made and passed to form and incorporate a new mass spectrometry society for the purpose of better encompassing the professional interest and activities of mass spectroscopists, and whose obligation it would be to sponsor the annual conferences.

The new society will be the "American Society for Mass Spectrometry," and will work in close cooperation with and meet jointly with E-14, whose activities will be concerned with standards and procedures, analytical methods, and general aspects of mass spectrometry and allied techniques.

It was also moved and passed that the Pennsylvania incorporators be asked to

name the present officers of E-14 to the corresponding offices in the American Society for Mass Spectrometry. V. D. Dibeler, as nominating committee chairman, reported the slate of H. R. Harless as chairman, H. E. Lumpkin as vice-chairman, and W. F. Kuhn as secretary-treasurer for future E-14 officers. No additional nominations were made from the floor, and it was voted without opposing vote to accept the nominating committee report and declare the nominees elected.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee E-14.2 on Fundamental and Theoretical Aspects (W. A. Chupka, chairman)—An invited lecture on optical spectra of ions was given, and symposia on electron impact-photoionization theory, ion-molecule kinematics, and electron spectroscopy were held.

Subcommittee E-14.3 on Mass Spectrometer Operations (M. C. Hamming, chairman)—An informal "mass spectrometry newsletter" will be circulated quarterly to those who make one contribution a year. Computer program availability was listed, and there was discussion on the patentability or copyrighting of some programs.

Subcommittee E-14.4 on Data and Information Problems (H. R. Harless, chairman)—The new *Index of Mass Spectral Data (AMD 11)* was published by ASTM in June 1969. Cooperation with the data centers in England and Sweden is facilitated by an advisory committee. Two invited speakers discussed the problems involved in exchange of software of a nonproprietary nature.

Subcommittee E-14.5 on New Instrumentation and Techniques (H. J. Svec, chairman)—The discussion centered on the ap-

REPORT OF COMMITTEE E-14

plication of gas chromatography - mass spectrometry techniques.

Subcommittee E-14.7 on Study of Solids (A. J. Ahearn, chairman)—Progress has been made by task forces working on analysis of platinum standards and on relative sensitivity coefficients. E. B. Owens moderated a workshop discussion of plate read-

ers and data reduction for inorganic spark source spectra.

Respectfully submitted on behalf of the committee,

H. R. HARLESS,
Chairman

W. F. KUHN,
Secretary-Treasurer

REPORT OF COMMITTEE

E-15 ON ANALYSIS AND TESTING OF INDUSTRIAL CHEMICALS

Committee E-15 on Analysis and Testing of Industrial Chemicals held two meetings during the year: June 25-27 in Atlantic City, N. J., and January 14-16 in Cleveland, Ohio. The committee consists of 150 participating members composed of 140 voting members and represents 80 organizations and individuals on 20 ASTM committees. There are also 10 consulting members.

The following subcommittee chairmen were appointed: American National Standards Committee ISO/TC 47 on chemistry, R. L. Anderson; Subcommittee A-2 on Functional Groups—D. K. Bannerjee; Subcommittee A-3 on Physical Properties, L. E. Tufts; Subcommittee A-4 on Water, J. R. McCarthy; Subcommittee B-1 on Mineral Acids, D. C. Swanson; Subcommittee B-3 on Alcohols and Polyalcohols, J. E. Hicks.

Committee E-15 has remained active in reviewing methods of analysis for the American National Standards Institute through ISOANSICOM T/47 on Chemistry. While no new subcommittees were formed, the analysis of calcium choride was consolidated in E-15 and the transfer from E-1 Subcommittee 22 on pH measurements took place.

The following officers for 1970-1972 were elected by letter ballot:

Chairman, T. P. Callan, Jr.

Vice-Chairmen, E. W. Wilson, Product Methods; R. L. Anderson, Practices; Leavitt Gard, General Methods

Members-at-Large, D. K. Bannerjee, S. M. Tuthill

Treasurer, C. H. Schmiede

The Secretariat is supplied through the Manufacturing Chemists Association with K. D. Johnson, the present appointee.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report,

Committee E-15 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which became effective on the dates indicated:

New Standard:

E 394 - 70, Test for Iron in Trace Quantities using the 1, 10-Phenanthroline Method. (Subcommittee A1) (effective March 19, 1970)

This method covers the determination of iron in the range of 1 to 100 μg .

AMERICAN NATIONAL STANDARDS

The following ASTM Standards have been approved during the year as American National Standards by the American National Standards Institute:

E 324 - 69; ANSI K69.1-1970, Relative Initial and Final Melting Points, and the Melting Range of Industrial Organic Chemicals

E 335 - 69; ANSI K71.1-1970, Test for Hydroxyl Groups by Pyromellitic Dianhydride Esterification

E 202 - 67; ANSI K72.1-1970, Analysis of Ethylene Glycols and Propylene Glycols

E 256 - 67; ANSI K73.1-1970, Test for Chlorine in Organic Compounds by Sodium Peroxide Bomb Ignition

E 257 - 67; ANSI K74.1-1970, Test for Sulfur in Organic Compounds by Sodium Peroxide Bomb Ignition

E 325 - 68; ANSI K75.1-1970, Test for Silicon in Organic Compounds by Peroxide Bomb Ignition

E 357 - 68; ANSI K76.1-1970, Test for Phosphorus in Organic Compounds by Peroxide Bomb Ignition

REPORT OF COMMITTEE E-15

ACTIVITIES OF SUBCOMMITTEES

Committees on Practices (R. L. Anderson, Chairman)

Subcommittee 1 on Editing and Nomenclature (W. J. Sweet, chairman)—The committee was saddened by the death of the chairman. The drafts and revisions of tentative and standards during the period were received by several of the members including D. K. Bannerjee who gave special assistance.

Subcommittee 2 on Standards and Reagents (S. M. Tuthill, chairman)—The subcommittee is gathering data on the standardization of 0.25 *N* sodium acetate in connection with its study of the hydrogen bromide method for the determination of tertiary hydroxyl groups. A study of the mercuric acetate reagent thought to be causing variations in the analytical procedure for unsaturation showed that the problems were elsewhere. It was found that 0.5 *N* methanolic hydrochloric acid used in the determination of acetic anhydride (Subcommittee B-4) was not a general use reagent therefore it would not be included in E 200.

Subcommittee 4 on Sampling (H. J. Behrend, chairman) reported that the Recommended Practices of Sampling Solids was approved by D-16. Subcommittee J of D-14 approved by ballot the third draft on "Acceptance Sampling for the Mean of a Lot for Which Basic Variance Has Been Previously Estimated." Acceptance by D-16 of the above will permit its addition to the statistical section of E 300 - 69. A survey of sampling procedures for slurries was conducted by D. C. Swenson. Since his resignation the work has been delayed until a new task group leader is found.

Subcommittee A-1 on Elements (Leavitt Gard, chairman)—The method for Trace Amounts of Iron by 1,10-Phenanthroline was completed and will be designated as E 394 (J. F. Fisher, leader). The method covering halogens in organic compounds by Oxygen Flask Decomposition submitted to letter ballot and the method for Sulfur in Organic Compounds by Oxygen Flask Decomposition was readied for full committee ballot. (John Kobliska, leader)

S. M. Tuthill drafted a proposed test method for the colorimetric determination of arsenic by the silver diethyldithiocarbamate procedure which is being screened

under the direction of Alonzo Farmer at two levels of arsenic, both organic and inorganic.

A task group with J. Deily as leader clarified the scope of their work to include first lead and then other metals in the atomic absorption procedures. Organic samples will be covered separately since their preparation is more difficult. A new task group (Y. Schubert and John Kobliska, leaders) will prepare methods covering fluoride in organic compounds by Oxygen Flask Decomposition. Interest was sought in the following methods—carbon, hydrogen and nitrogen in organic compounds, trace concentrations of sulfur and chlorine and specific ion electrodes.

Subcommittee A-2 on Functional Groups (T. P. Callan, Jr., chairman)—The hydrogen bromide method for tertiary hydroxyl content was submitted to another screening study after it was determined further revision was necessary. Three other methods are under review (a) a nitrite ester colorimetric (b) differential reaction rate acetylation (c) pseudo first order differential infrared procedure (J. Magnuson, leader). The task group on unsaturation (H. A. Sweeney, leader) continued work on the mercurimetric method including standardization of the back titration portion. Eight laboratories are collaborating in the study.

The peroxide Task Group (D. K. Bannerjee, leader) prepared a DPPD (*N,N*-diphenyl-*p*-phenylene-diamine) colorimetric method for low concentrations which is under collaborative study. The gas chromatographic procedure for assay of di-*t*-butyl peroxide is ready for evaluation. The second section of the safety publication ASTM STP 471 entitled "Laboratory Handling and Storage of Peroxy Compounds" was published. A third section is being planned.

The Carbonyl Task Group (J. F. Fisher, leader) completed cooperative testing of a procedure to measure low concentrations of carbonyl in organic solvents and finalized the method for letter ballot.

A task group (T. P. Callan, Jr., leader) was formed to develop assay procedures for organic anhydrides. Five chemical and one instrumental methods were evaluated with a modified morpholine-carbon disulfide procedure to be submitted to a screening study by three laboratories.

A new task group (J. Deily, leader) was

REPORT OF COMMITTEE E-15

established on the analysis of amines. The scope is to be further developed.

Subcommittee A-3 on Physical Properties (L. E. Tufts, Chairman)—The subcommittee accepted the responsibilities after the transfer from E-1, Subcommittee 22, for pH measurements of aqueous solutions using glass electrodes with approval by E-15.

Density-Volume tables were developed by the task group (T. M. Brye, leader) for 12 new chemicals and the data will be published in the English units. This completes the current list and those interested in the new chemicals should contact the leader.

Interest surveys were conducted on bulk density and the determination of purity by accurate measurement of the last crystal point.

The task group on color (R. L. Anderson, leader) completed a collaborative study on Pt-Co standards in the 0-25 unit range using 5-cm cells with 5 instruments. Since the precision was not as good as expected, a new series will be run using the 10-cm cells.

Subcommittee A-4 on Water (J. R. McCarthy, chairman)—The task group on Water in Solids (C. D. Lewis, leader) completed initial studies on moisture in polyethylene and polymethylmethacrylate using Karl Fischer modified procedure.

The Task Group on Water in Gases (J. R. McCarthy, leader) completed a collaborative study on isobutane and 2 cylinders of refrigerant 12. Several suggested changes were received.

Subcommittee on Product Methods (E. W. Wilson, chairman)—Subcommittee B-1 mineral acids (D. C. Swanson, chairman) was in need of task group leaders. The work on sulfuric and hydrochloric acid was essentially complete except for the determination of free chlorine in HCl. Work to be completed on phosphoric acid included assay method (P_2O_5) by Quimociac, solids and fluorine. Remaining on hydrofluoric acid were fluosilicic acid (H_2SiF_6) and sulfate under the leadership of J. W. Alexander. The sulfate method was approved for letter ballot and interest was shown in developing a turbidometric method.

Subcommittee B-2 on Alkalies (C. H. Schmiede, chairman)—A recommended "Practice for Evaluating Large Bulk Volumes of Caustic Liquors" will be subjected to a screening study by three laboratories.

The methods developed for sodium chloride including moisture, water insolubles, calcium, magnesium, sulfate and alkalinity or acidity will be included in the collaborative study by ten or more laboratories.

The activities of calcium chloride task group will be transferred to B-2.

Subcommittee L-3 on Alcohols and Poly-alcohols (J. E. Hicks, chairman)—To be added to the methanol methods will be procedures for iron and impurities by gas chromatography.

A task group on higher primary alcohols (C_6-C_{10}) under the leadership of R. E. Robey will consider such alcohols as 2-ethylhexanol and pertinent normal and oxyalcohols. To be included in the program will be test methods for acidity, color, specific gravity, water, carbonyl, hydroxyl, ester and pour point.

Subcommittee on Organic Acids and Derivatives (J. F. Fisher, chairman)—The iron method from Subcommittee A-1 will be adopted for use on acids and anhydrides. Work is continuing on a suitable instrumental procedure for permanaganate oxidizables in acetic anhydride. The work was completed on the morpholine procedures for the assay of acetic anhydride and will be submitted to letter ballot. Consideration is being given to a gas chromatographic procedure for the analysis of acetic anhydride, especially free acid using silylation.

Subcommittee B-5 on Aluminum and Related Compounds (C. Monstiller, chairman)—There was no report from this subcommittee at this time since they hold their winter meeting at the time of the Pittsburgh Conference.

Subcommittee B-6 on Organo-Metallics (J. W. Alexander, chairman)—The subcommittee is now on inactive status having completed current assignments.

Task Group on Compressed Gases (R. E. Shepard, leader)—The collaborative study covering assay of chlorine by the moist zinc amalgam, moisture and gravimetric residue methods was completed. Letter ballot was completed. No other areas of chlorine analysis are anticipated at this time. Interest in other gases will be solicited from the Compressed Gas Association and others.

Task Group on Calcium Chloride (G. B. Wengert, leader)—Under study by the committee are two types of calcium chloride, Type I (77 percent) and Type II (94 percent)

REPORT OF COMMITTEE E-15

for assay by EDTA titration, calcium hydroxide by alkalinity titration, and magnesium, sodium and potassium by atomic absorption. Both gamma hydroxynaphthol blue and calcin indicators will be evaluated for the calcium titration. This committee's activities will be transferred to B-2 under alkalies.

USA Committee for ISO/TC 47 on Chemistry, (R. L. Anderson, chairman)—The problem confronting the committee was to organize the procedures and division of duties to make it possible for the subcommittee chairman to function effectively with a feasible level of effort. One desire was to increase the effectiveness of the U. S. groups and permit wider participation, since the U. S. was involved presently with only five working groups. Greater lead time to effectively review proposed draft recommendations was always of utmost importance. The method of operation which would encompass the above points was approved subject to review by ASTM headquarters and American National Standards Institute.

Recommendations for vote on the following ISO/TC 47 Draft Recommendations were made to the American National Standards Institute:

- DR 1869, Methylene Chloride (Dichloromethane) for Methods of Test (Secretariat-674) 935E (5 Methods).
- DR 1870, Chloroform for Industrial Use, Methods of Test, (Secretariat-675) 936E (5 Methods).
- DR 1843, Higher Alcohols for Industrial Use, Measurement of Colour, (Secretariat-644) 905E.
- DR 1844, Higher Alcohols for Industrial Use, Determination of Density at 20° C, (Secretariat-645) 906E.
- DR 1845, Higher Alcohols for Industrial Use, Determination of Distillation Yield, (Secretariat-646) 907E.
- DR 1846, Higher Alcohols for Industrial Use, Determination of Acidity to Phenolphthalein (Volumetric Method). (Secretariat-647) 908E.
- DR 1847, Higher Alcohols for Industrial Use, Determination of Carbonyl Compounds (Potentiometric Method), (Secretariat-648) 909E.
- DR 1848, Higher Alcohols for Industrial Use, Determination of Bromine Index (in the Presence of Mercuric Chloride), (Sec-

retariat-649) 910E.

- DR 1849, Higher Alcohols for Industrial Use, Determination of Water Content by the Karl Fischer Method, (Secretariat-650) 911E.
- DR 1850, Higher Alcohols for Industrial Use, Determination of Total Alcohols Content (Volumetric Method), (Secretariat-651) 912E.
- DR 1851, Higher Alcohols for Industrial Use, Determination of Ash (Gravimetric Method), (Secretariat-652) 913 E.
- DR 1852, Higher Alcohols for Industrial Use, Test for Colour with Sulfuric Acid, (Secretariat-653) 914E.
- DR 1913, Formic Acid for Industrial Use, Determination of Low Contents of Acids Other Than Formic Acid—(Less than 0.5% (m/m) Calculated as Acetic Acid)—Volumetric Method, (Secretariat-680) 941E.
- DR 1914, Boric Acid for Industrial Use—Method of Assay—Determination of Boric Acid Content—Volumetric Method, (Secretariat-682) 943E.
- DR 1915, Boric Oxide for Industrial Use—Method of Assay—Determination of Boric Oxide Content—Volumetric Method, (Secretariat-683) 944E.
- DR 1916, Disodium Tetraborates for Industrial Use—Determination of Sodium Oxide and Boric Acid Contents and Loss on Ignition, (Secretariat-684) 945E.
- DR 1917, Hydrated Sodium Perborates for Industrial Use—Determination of Sodium Oxide, Boric Oxide, and Available Oxygen Contents—Volumetric Method, (Secretariat-685) 946E.
- DR 1918, Boric Acid, Boric Oxide, and Disodium Tetraborates for Industrial Use—Determination of Sulphur Compounds—Volumetric Method, (Secretariat-686) 947E.

In addition to the above Draft Recommendations, we provided technical comments on Draft British Standard No. 69/10799, Testing Water Used in Industry, Part 10: Sodium, Potassium, and Lithium (Metric Units) (Revision of BS 2690).

Respectfully submitted on behalf of the committee,

E. N. LUCE,
Chairman

K. D. JOHNSON,
Secretary

REPORT OF COMMITTEE

E-16 ON SAMPLING AND ANALYSIS OF METAL BEARING ORES AND RELATED MATERIALS

Committee E-16 on Sampling and Analysis of Metal Bearing Ores and Related Materials and its subcommittees held two meetings during the year: on June 23 to 25, 1969, at Atlantic City, N.J., and on Dec. 7 to 9, 1969 at Cincinnati, Ohio. The Editorial and Definitions Subcommittee held a third meeting on February 26 and 27 at Bethlehem, Pa.

The committee consists of 95 members, none of whom are classified. This is an increase of 10 members during the past year. The voting membership is 84.

The officers elected for the ensuing term of two years are as follows:

Chairman, R. C. McAdam

Vice-Chairman, J. H. Ormsbee

Secretary, E. F. McGhee

Membership Secretary, A. K. McClellan
Members-at-Large of Executive Subcommittee, R. W. Bley and K. G. Von der Porten.

The following subcommittee officers were elected at the Annual Meeting in 1969. Subcommittee 2, Sampling: J. D. Clendenin, Chairman; E. F. McGhee, Vice-Chairman; C. B. Rash, Secretary; Subcommittee 3, Analysis: S. Kallmann, Chairman; G. B. Wengert, Vice-Chairman; J. D. Selvaggio, Secretary; Subcommittee 4, Physical Testing: O. E. Palasvirta, Chairman; A. J. Carlson, Vice-Chairman; J. E. Stukel, Secretary replacing S. E. Erickson who resigned as Secretary; Subcommittee 4, Physical Test-Committee for ISO/TC 102, F. A. Pennington, Chairman; J. B. Armstrong, Secretary.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual meeting, Committee E-16 submitted the following rec-

ommendations to the Society for action under the Interim Procedure for Standards, which were accepted by the Society effective on the dates indicated:

New Standards:

E 289 - 69, Test for Particle Size or Screen Analysis at No. 4 Sieve and Coarser for Metal Bearing Ores and Related Materials (Subcommittee 4), (effective Sept. 19, 1969)

This method covers the determination of the size distribution by screen analysis of metal bearing ores and related materials at No. 4 (4.76-mm) sieve and coarser. The sample is passed through a bank of standard sieves by agitation. The screening technique described in this procedure may be used on any solid particles that can be dried so that sieve blinding does not occur.

E 395 - 70, Test for Total Sulfur in Iron Ore by Combustion-Iodate Titration (Subcommittee 3) (effective March 19, 1970)

This method covers the determination of total sulfur in iron ores, concentrates, and agglomerates in the concentration range from 0.005 to 0.50 percent. A major portion of the sulfur in the sample is converted to sulfur dioxide by combustion in a stream of oxygen. The sulfur dioxide is absorbed in an acidified starch-iodine solution and titrated with potassium iodate solution. The potassium iodate solution is standardized against a similar type ore of known sulfur content since the percentage of sulfur evolved as sulfur dioxide varies with different materials.

AMERICAN NATIONAL STANDARDS

The following standard has been approved during the year as an American Na-

REPORT OF COMMITTEE E-16

tional Standard by the American National Standards Institute:

E 246 - 68; ANSI Z158.1-1969, Test for Total Iron in Iron Ores by Hydrogen Sulfide Reduction and Dichromate Titration

ACTIVITIES OF SUBCOMMITTEES

Subcommittee 1, Editorial and Definitions (J. H. Ormsbee, chairman) held a two-day meeting outside the regular committee meetings, Feb. 26-27, 1970, at Homer Research Laboratories, Bethlehem, Pa. Six members attended this meeting at which five tentative methods were reviewed and edited. These are ready to be submitted to Committee E-16 for balloting for adoption as standards.

Subcommittee 2, Sampling (J. D. Clendenin, chairman) has a third draft proposed method of sampling iron ore which is to be balloted at subcommittee level. This latest revision follows the principles of Committee D-5's method for sampling coal. The sampling of iron ore is still the priority method of the Sampling Subcommittee, and methods for other ores such as manganese, fluorspar, and chrome are being held in abeyance until the method for iron ore is completed.

Subcommittee 3, Analysis (Silve Kallmann, chairman) continues to progress in writing methods for iron ore, manganese ore, and fluorspar.

Iron Ore Task Force (J. B. Armstrong, chairman) is receiving results from the first round-robin evaluation of the atomic absorption methods for calcium, magnesium and aluminum. Future work being considered includes methods for the determination of the different forms of iron and the determination of titanium, combined water, and loss on ignition.

Manganese Ore Task Force (H. F. Wendt, chairman) has two methods for the determination of manganese dioxide (available oxygen) approved at subcommittee level, and these methods are being edited for submission to ballot at committee level. This task force is now working on atomic absorption methods for determining calcium, magnesium, and aluminum.

Fluorspar Task Force (W. J. Giustetti, chairman) has a method for the determination of silicon dioxide in fluorspar approved

at subcommittee level. This method has been submitted for editorial review prior to balloting at committee level. A method for the determination of calcium fluoride is now being prepared for evaluation.

Subcommittee 4, Physical Testing (O. E. Palasvirta, chairman) has task forces engaged in improving methods for determining the particle size distribution of ore by sieve testing and in writing methods for determining the physical strength of ores.

Sieve Testing Task Force (S. G. Lawrence, chairman) has developed methods for sieve testing ores at No. 4 sieve and finer and No. 4 sieve and coarser which have been accepted by the Society. Consideration is now being given by the task force to the combining of these two methods.

Physical Strength Task Force (A. J. Carlson, chairman) has completed its previous assignments and is now drafting a test to determine the bulk density of iron ore pellets. It was again considered whether a method for determining the reducibility of iron ores, pellets, and agglomerates should be written. It was decided not to at this time because of the questionable use of such a method. However the task force is closely following the International Organization for Standardization (ISO) activity in developing such a method.

Subcommittee 5, U.S.A. National Committee for ISO/TC 102 (F. A. Pennington, chairman) continues to be active in the evaluation and writing of methods for sampling, analysis, and physical testing of iron ore for consideration as ISO standards.

ISO/TC 102/SC 1, Sampling—The subcommittee received nine documents from the Japanese Secretariat relating to sampling iron ore. These were mailed to members with a request for comments and replies are awaited. Comments are urgently needed to guide the U.S.A. delegates in their deliberation at the next meeting. The Sixth Meeting of SC 1 will be held in Ottawa, Canada, Sept. 28 to Oct. 2, 1970.

ISO/TC 102/SC 2, Analysis—The U.S.A. delegates missed the meeting in Prague through a misunderstanding about the time of the meeting and a mix-up in reservations. Arrangements have been made for delegates to attend the Fifth Meeting in Rome, Italy,

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to be held May 20 to 23, 1970. The agenda for this meeting will include discussion of methods for the determination of aluminum, calcium, magnesium, sulfur, silicon, titanium, and manganese. Test data on these methods have been supplied by E-16 members.

ISO/TC 102/WG 1, Physical Testing—The U.S.A. holds the Secretariat of this subcommittee. Following submission of documents on proposals for bulk density determination of iron ores, pellets, and sinters at -40 and +40 mm particle size respectively, comments were received from Germany, Canada, the United Kingdom, Japan, and the United States. These draft proposals have been revised on the basis of these comments and redistributed. Further comments are awaited.

There is keen interest in a test to determine the reducibility of iron ore in Germany, France, Belgium, United Kingdom, and Japan. A draft proposal for such a test was prepared and submitted to the German delegation for its criticism. Changes were suggested and the proposal redrafted. It will be submitted as Document ISO/TC 102/WG 1 (Secretariat 48) 135E—First Draft ISO Proposal—Method for Measuring the Relative Reducibility of Natural and Processed Iron Ores. The next meeting of WG 1

will be in Ottawa, Canada, Sept. 21 to 25, 1970.

ISO/TC 102/WG 2, Size Determination—A meeting of WG 2 was held in London, Dec. 1 to 5, 1969. Discussions were held on Document N 68, Determination of Size Distribution of Sieving of Iron Ores—Material of Less than 4 mm, resulting in a decision to redraft the parts relating to reproducibility. An ad hoc committee was formed to compare hand and mechanical sieving data. Most delegates do not believe that hand sieving should be used as a standard method or reference point for other methods. Only members who submit data will attend meetings of ad hoc committee.

Joint E-15/E-16 Subcommittee on Alumina, Bauxite, and Related Chemicals (C. M. Marsteller, chairman)—Mr. Marsteller replaced J. R. Churchill as chairman of the joint subcommittee. A meeting of this joint subcommittee was held on June 26 at Atlantic City, N. J. There has been no activity between the subcommittee and Committee E-16 since that time.

Respectfully submitted on behalf of the committee,

W. F. HORSBROFT, JR.,
Chairman

R. C. McADAM,
Secretary

REPORT OF COMMITTEE E-17 ON SKID RESISTANCE

Following its usual custom, Committee E-17 on Skid Resistance held two meetings during the year. The first was in conjunction with the Annual Meeting in Atlantic City, N. J., June 22-27, 1969, and the second on Nov. 13 and 14, 1969, on the campus of Texas A & M University.

All subcommittees met during both meetings.

Membership of Committee E-17 is not classified. It consists of 76 voting members and 7 consulting members. W. A. Goodwin was elected as chairman to fill the unexpired term of Tilton E. Shelburne who died the preceding October. A. Y. Casanova was elected first vice-chairman, filling the vacancy by Mr. Goodwin moving to chairman; and W. E. Meyer was elected second vice-chairman, filling the vacancy created by Mr. Casanova moving to first vice-chairman. Ross Wilcox was elected as member of the Executive Committee, filling the vacancy created by Dr. Meyer moving to second vice-chairman. F. A. Renninger was appointed chairman of Subcommittee IIb (E17.22) to serve out the unexpired term of W. A. Goodwin. Harry Keen was appointed chairman of Subcommittee IIc (E17.25) to serve out the unexpired term of H. W. "Pete" Kummer who died the previous Fall. Clarence Hofelt was appointed chairman of Committee Ib (E17.12).

Subcommittee numbering system was changed in accordance with the request of Headquarters office. The main committee will be known as Committee E17.00 and the Executive Subcommittee as E17.01. The Group I Subcommittees will all be E17.1- and the Group II Subcommittees will all be E17.2-. None of the titles or scopes of the subcommittees was changed.

The papers presented at the Symposia on Pavement Skid Resistance at the Fall 1968

Meeting in Atlanta, Ga., were published in *STP 456*.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURES FOR STANDARDS

Subsequent to the 1969 annual report, Committee E-17 submitted the following recommendation to the Society for action under the Interim Procedure for Standards, which was accepted by the Society effective Oct. 17, 1969:

Tentative Adopted as Standard Without Revision:

E 303 - 69 (formerly E 303 - 66 T), Test for Measuring Surface Frictional Properties Using the British Portable Tester (Subcommittee E17.22)

Method E 274 - 65 T, Test for Skid Resistance of Highway Pavements Using a Two-Wheel Trailer, received special permission from the Committee on Standards for continuation until March 1971.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee E17.21 on Field Methods of Measuring Vehicular Friction (W. B. Horne, chairman)—Passage of the Federal Highway Safety Act in 1966 and concern about the ground operational safety of aircraft, especially for the jumbo jets and supersonic transports now entering operation, has resulted in a large research effort in the United States and Europe regarding the slipperiness of pavements and methods for measuring this slipperiness by means of vehicular friction. As a consequence of this research, many new methods for measuring vehicular friction have been proposed which are either modifications of the initial ASTM skid trailer standard, or second generation

REPORT OF COMMITTEE E-17

equipment. In an effort to keep pace with this explosive expansion of skid research, Subcommittee E17.21 has formed the following task groups to set tentative specifications and, hopefully, ASTM standards for the following vehicle friction measuring techniques:

Trailer Method of Test—Purpose: To develop simple design specifications for a trailer with minimum capability limited to obtaining survey friction data for pavement surface maintenance and research purposes. Membership: William Gartner, chairman; K. J. Law, D. C. Mahone, W. E. Meyer, F. W. Petring, D. D. Anderson, C. E. Starkey.

Side Friction and Impending Skid Method of Test—Purpose: This task group will define specifications for trailers or vehicles that obtain vehicular friction by measuring cornering forces of tires under yawed rolling, or by measuring peak braking forces on a tire near the incipient skid point. Membership: W. E. Meyer, chairman; D. D. Anderson, A. Y. Casanova III, W. B. Horne, H. M. Keen, F. X. Schwartz.

Automobile Stopping Distance (4-wheel) Method of Test—Purpose: This task group is charged with developing a tentative method of test for measuring stopping distance on paved surfaces using a vehicle equipped with full-scale tires. Membership: R. L. Rizenbergs, chairman; W. B. Horne, A. H. Easton (others to be added).

Automobile Stopping Distance (Diagonal-Wheel) Method of Test—Purpose: This task group is charged with developing a tentative method of test for measuring stopping distance on paved surfaces using a diagonal-braked vehicle equipped with full-scale tires. Membership: W. B. Horne, chairman; R. L. Rizenbergs, A. H. Easton, Frank Herzegh (others to be added).

Decelerometer Methods for Measuring Pavement Friction with Automobiles—Purpose: This task group is charged with preparation of specifications for the measurement of both lateral and longitudinal accelerations in connection with automobile methods of test. Membership: A. H. Easton, chairman; (others to be added).

It is expected that all of these task groups will report their findings at the June Meeting in Toronto.

Other results of interest developed during the past year indicate that a more rigid specification for the trailer self-watering feature needs to be accomplished; an urgent need exists for supplying the ASTM test tire (E 249-66) in different wheel sizes with smooth as well as specified rib tread, or the furnishing of ASTM tread rubber for tire recapping purposes.

Subcommittee E17.22 on Laboratory Methods for Measuring Vehicular Friction (F. A. Renninger, chairman) has functioned during the past year through four task groups. Three of the task groups are charged with developing new standard methods of test with which pavement skid resistance may be predetermined in the laboratory. The fourth task group has been instructed to examine ASTM E 303-69 and to recommend possible revisions to the subcommittee.

The following tabulation describes the current status of Subcommittee E17.22 task force activity:

(1) **Task Force 68-1** (Desmond Moore, chairman)—Method E 303-69, just recently adopted as standard, is being reviewed to determine any need for revision. Certain points have been raised which point to possible misinterpretation of the method. It is hoped that suggested revisions will be presented to the subcommittee at its meeting in June 1970.

(2) **Task Force 68-2** (K. D. Hankins, chairman)—This group, charged with the standardization of the Circular Track Method for the predetermination of pavement skid resistance, has submitted a working outline of the items necessary to such a method. They anticipate having available for subcommittee comment in June an initial draft of those sections of the proposed method covering scope, apparatus, and specimen preparation.

(3) **Task Force 68-3** (G. C. Balmer, chairman) is currently developing another draft of a proposed method of test for skid resistance predetermination using a full-scale method. They report progress and anticipate a possible draft ready for subcommittee consideration later this year.

(4) **Task Force 68-4** (W. T. Stapler, chair-

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man) has anticipated considerable staffing problems but some progress has been made by its chairman. A method for predetermination employing a small torque device should be forthcoming in time for the June 1970 meeting.

Respectfully submitted on behalf of the committee,

W. A. GOODWIN,
Chairman

WILLIAM GARTNER, JR.,
Secretary

REPORT OF COMMITTEE E-18 ON SENSORY EVALUATION OF MATERIALS AND PRODUCTS

Committee E-18 on Sensory Evaluation of Materials and Products met Jan. 7 to 9, 1970, in Fort Lauderdale, Fla.

The officers elected for the two-year term from June 1970 to June 1972 are:

Chairman, Robert A. Baker
Vice-Chairman, Frederick Sullivan
Secretary, Barbara Hasenzahl

ACTIVITIES OF SUBCOMMITTEES

Subcommittee II on Principles of Psychophysical Test Methods (W. H. Danker, chairman) is continuing studies on supra-threshold sensory evaluation considerations in consumer and consumer product classifications.

Subcommittee III on Preparation of Recommended Practices (D. R. Peryam, chairman) is currently working in the following six areas: effect of pack aging materials, film

performance score test, palatability test for quality control, codification of experimental conditions and controls, supra-threshold odor intensity, and consumer research in the field.

Subcommittee IV on Instrumental-Sensory Relationships (W. H. Stahl, chairman) has accumulated more than a thousand threshold values, on some 800 chemical compounds, compiled these on punch cards and is studying the mechanics of making these data available in book and tape form. This group also is assessing supra-threshold odor intensity techniques.

Respectfully submitted on behalf of the committee,

R. A. BAKER,
Chairman

NAOMI O. SCHWARTZ,
Secretary

REPORT OF COMMITTEE E-19 ON CHROMATOGRAPHY

Committee E-19 on Chromatography held its Eighth Annual Meeting on "The Practice of Chromatography" in Philadelphia, Pa., from Sept. 23 to 26, 1969. Two hundred and fifty one registrants signed in. All subcommittees and task groups met, and the usual E-19 General Business Meeting was held. Technical sessions included Quantitation and Standardization of Gas Chromatographic Systems, High Resolution Gas Chromatographic Capillary Column Analysis of Hydrocarbons, Automation of the Gas Chromatographic Laboratory, Gas Chromatography in Toxicology, Liquid Chromatographic Analysis of High Molecular Weight Hydrocarbons, Life Science Applications of Liquid Chromatography, and Applications of Gel Permeation Chromatography.

Committee E-19 had 196 individuals representing 152 voting units, and 23 consulting members, at the end of 1969. Persons interested in working with Committee E-19 are urged to contact Membership Secretary O. L. Hollis, The Dow Chemical Co., Building B-1462, Freeport, Tex. 77541.

The E-19 Executive Committee met four times during 1969: on March 6, at the Pittsburgh Conference in Cleveland, Ohio, and three times during and just after the 1969 E-19 Annual Meeting.

Liaison was maintained with ASTM Committees D-1, D-2, D-3, D-4, D-11, D-12, D-13, D-19, D-20, D-22, D-24, and E-20 as well as with the American Association of Oil Chemists, the Coordinating Research Council, the Institute of Gas Technology, the Natural Gasoline Processors Association, and the American Oil Chemists' Society.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report,

Committee E-19 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which became effective on Oct. 17, 1969:

Tentative Adopted as Standard Without Revision:

E 260 - 69 (formerly E 260 - 65 T), Recommended Practice for General Gas Chromatography Procedures (Subcommittee IV)

This standard appears in the 1970 *Annual Book of ASTM Standards*, Part 30.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee I on Definitions, Nomenclature and Standard Data (B. O. Ayers, chairman) accomplished the following matters:

Task Group 1, Exploratory (B. O. Ayers, chairman): Worldwide correspondence on E 355 resulted in a number of changes. These were discussed at the open meeting of Subcommittee I during the 1969 E-19 Annual Meeting. A version of E 355 that incorporates agreed-upon editorial changes will be submitted to ASTM. A list of the changes that require the resolving of different opinions will be sent to the E-19 membership for their study and eventual letter balloting, and will be recommended for publication in the *Journal of Chromatographic Science* to get the widest possible consensus.

Task Group 2 on the Storage and Retrieval of Gas Chromatographic Data (O. E. Schupp III, chairman) was advanced to Subcommittee VI status in 1969.

Task Group 3 on Standard Data (S. T. Preston, Jr., chairman) continued to explore experimental requirements for gas chromatographic reference data, the possible use of experimental column parameters to define a limited set of standard columns,

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and the feasibility of organizing a group for systematic generation of reference data.

Subcommittee II on Programs and Papers (K. J. Bombaugh and J. M. Gill, co-chairmen) organized and conducted the technical program at the Eighth Annual Meeting of Committee E-19 on The Practice of Chromatography. Business arrangements were handled by Vice-Chairman S. T. Preston, Jr., and other meeting matters by Program Secretary L. Mikkelsen. The Ninth Annual Meeting on The Practice of Chromatography will be held Oct. 11-14, 1970, at the Brown Palace Hotel in Denver, Colo. Major session categories will be Separation, Detection, and Quantitation. Other activities will include meetings of all subdivisions of the committee, the social hours, the annual banquet, and a wives program.

Subcommittee III on Research (L. S. Ette, chairman) continued to develop standard definitions and tests for detectors. This work was executed by the following task groups: Task Group 1 on Flame Ionization Detectors (R. D. Condon, chairman), Task Group 2 on Thermal Conductivity Detectors (R. Villalobos, chairman), and Task Group 3 on Electron Capture Detectors (R. A. Landowne, chairman). Proposed specifications for these various detection systems were agreed upon at the 1969 E-19 Annual Meeting. Recommended standards will be drawn up for letter balloting by the E-19 membership in 1970.

Subcommittee IV on Coordination and Standardization of Methods (R. M. Bethea, chairman) accomplished the following business through its task groups: Task Group 1 on Standard Format (J. H. Fager, chairman) processed their Recommended Practice for Standard Gas Chromatography Method Format through an affirmative E-19 letter balloting, and it was submitted by the committee to ASTM. Task Group 2 on Methods Review (D. L. Camin, chairman) reviewed seven gas chromatography methods and received eight more plus two other chromatography methods for review. Task Group 3 on General Gas Chromatography Procedures (H. L. Findley, chairman) processed a modernized version of E 260-65 T through an affirmative letter balloting with all negatives resolved. This was submitted to ASTM for adoption as standard.

Task Group 4 on Cooperative Sample Testing (D. C. Ford, chairman) distributed a six-page report on the 1968 Solvent Blend testing, including a statistical analysis of the results, at the 1969 E-19 Annual Meeting, and discussed the significance of the data. They showed an improvement in both precision and accuracy compared to the similar 1964 cooperative sample. On special request, 15 vials of the 1968 sample were furnished to Prof. F. W. Karasek, of the University of Waterloo, Ontario, Canada, for a special teaching study in quantitative gas chromatography. Two kinds of 1969 samples were offered, a glycol mixture and a chlorinated solvent mix. Forty one and thirty requests for these, respectively, have been received. The results will be reported at the 1970 E-19 Annual Meeting. A wide range normal hydrocarbon blend (nC_4 to nC_{20}), and a fatty acid blend, are proposed for the 1970 test sample, to be reported in 1971.

Subcommittee V on Standard Materials and Reagents (D. L. Camin, chairman) functioned through its Task Group 1 on Standard Materials and Reagents (W. O. McReynolds, chairman). They distributed a six-page report at the E-19 Annual Meeting giving both relative retentions and retention indices for six compounds of various polarities as determined by each of 13 cooperators, and statistically summarized the results, using a 6-ring polyphenylether liquid phase at 120 and 160 °C. Similar testing of a modified Carbowax is planned.

Subcommittee VI on Storage and Retrieval of Chromatographic Data (O. E. Schupp III, chairman) continued its work with gas chromatographic data and continued its efforts to process liquid chromatography data similarly. About 20,000 additional retention data compiled since 1966 will be issued in 1970 as a supplement to the present DS 25 A Compilation of Gas Chromatographic Retention Data. Task Group activities include:

Task Group 1 on Direction, Policy, Format and Layout (O. E. Schupp III, chairman) has streamlined the format, computer-checked all through-1968 data, forwarded these data to ASTM for dissemination as Supplement 1 and as a magnetic (computer) tape containing all the data, microfilmed

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all the data for ASTM reproduction, and prepared an introduction to Supplement 1.

Task Group 2 on Abstracting Data from Published Sources (F. W. Karasek, chairman) has established a second abstracting operation at the University of Waterloo, and has arranged for the necessary contractual support from ASTM for 1970.

Task Group 3 on Compiling Unpublished and Published Copyrighted Data (R. A. Hively, chairman) solicited data from 47 gas chromatography instrument makers, and from many private individuals.

Task Group 4 on Supplementary Tables put these in final form and sent them to ASTM; new materials are being investigated for coding.

Task Group 5 on Correction of Errors in the DS 25 A Compilation (J. R. Mann,

chairman) will eradicate invalid data now in the compilation and will establish criteria for identifying invalid data at the time they are coded into the compilation.

Task Group 6 on Liquid Chromatographic Data (E. W. Albaugh, chairman) is devising a storage and retrieval system in preparation for its compilation.

Finally, new by-laws were worked up to implement the broadening of the scope of Committee E-19 from gas chromatography to encompass all forms of chromatography.

Respectfully submitted on behalf of the committee,

E. M. EMERY,
Chairman

M. G. BLOCH,
Secretary-Treasurer

REPORT OF COMMITTEE E-20 ON TEMPERATURE MEASUREMENT

Committee E-20 on Temperature Measurement held two meetings during the year: on June 29, 1969, in Atlantic City, N. J., and on Dec. 12, 1969, in Cincinnati, Ohio. Subcommittee III on Resistance Thermometers held meetings on July 28, 1969, in Gaithersburg, Md., and on Dec. 11, 1969, in Cincinnati, Ohio. Subcommittee IV on Thermocouples and its sections held meetings on June 25 to 27, 1969, in Atlantic City, N. J., and on Dec. 10 to 12, 1969, in Cincinnati, Ohio. Subcommittee V on Liquid-in-Glass Thermometers held meetings on April 25, 1969, and Nov. 21, 1969, in Philadelphia, Pa.

The committee consists of 109 voting members whose interests cover both the manufacture and use of temperature measuring instruments. The committee membership is unclassified.

The bylaws were modified to improve the procedure for nomination and election of the officers and the handling of letter ballots.

An extensive project to prepare a comprehensive monograph on thermo-electric thermometry has been completed. *STP 470, Manual on Use of Thermocouples in Temperature Measurement*, prepared by a subcommittee under the chairmanship of R. P. Benedict of Westinghouse Electric Corp., has received final editing and will be issued in the coming fall. This is the most complete and detailed treatment of this subject ever prepared and should stand as a resource monument for years to come.

It is with great regret that the deaths of three founder members of the committee are reported. R. Mason Wilhelm was chairman for many years of Subcommittee 17 of Committee E-1 on Liquid-in-Glass Thermometers and its predecessor, Section A of Subcommittee 12. Valentine Hiergesell was also an active member of E-1, Subcommittee 17, and

shared in the formation of Committee E-20. Dr. Bert Brenner was a member of Subcommittee 32 on Thermocouples of Committee E-1 and took part in the organization of Committee E-20. One of his last and greatest achievements was the melting and fabrication of ultrapure platinum wire which has become the new national thermocouple reference standard, NBS Pt 67. Also regretfully reported is the death of Dr. F. W. Kuether, an active member of Subcommittee IV on Thermocouples.

Subcommittee III on Resistance Thermometers, inactive for the past year, has been revitalized with the designation of Wiley W. Johnston, Jr., of the Oak Ridge National Laboratory as chairman.

The following slate of officers has been elected for the 1970-72 term:

Chairman, D. I. Finch

Vice-Chairman, L. C. Liberatore

Secretary, H. J. Greenberg

Membership Secretary, R. F. Abrahamsen

The officers and the chairman of the subcommittee constitute the executive committee.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee E-20 submitted the following recommendation to the Society for action under the Interim Procedure for Standards, which became effective May 29, 1970:

Revision of Standard:

E 1 - 70 (formerly E 1 - 68), Specifications for ASTM Thermometers (Subcommittee V)

This was to change the range of ASTM Thermometer 9C from -5 to +110 C to

REPORT OF COMMITTEE E-20

read -7 to $+110$ C. This change, made at the suggestion of the Netherlands Normalisatie-Instituut, will remove a discrepancy between the thermometer specification and ASTM Method D 93, Test for Flash Point by Pensky-Martens Closed Tester. It also included deletion of ASTM Thermometer 53C, Benzene Freezing Point, since it has been replaced in ASTM Method D 852, Test for Solidification Point of Benzene, by a superior thermometer 112C, Solidification Point of Benzene.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee II on Radiation Thermometers (H. J. Kostkowski, chairman) has made significant progress in the preparation of recommended practices for optical pyrometry. It is anticipated that this project will be completed by the end of the present year.

Subcommittee III on Resistance Thermometers (W. W. Johnston, Jr., chairman) has renewed its efforts to prepare a method of test for platinum resistance thermometers. Completion during the next year is anticipated. Development of specifications for industrial platinum thermometers and other resistance thermometers will follow.

Subcommittee IV on Thermocouples (D. I. Finch, chairman) continued with the development of specifications and methods of test for various thermocouples. These include two methods involving noble metal thermocouples and two methods for refractory metal thermocouples. The method of test for comparative emf stability of base metal thermocouple alloys in air is nearly completed. Specifications for sheathed electrical-resistance heaters for nuclear applications are in letter ballot and should be ready for submittal to the Society shortly.

The work at the Bureau of Standards continues on recomputation of the emf tables for thermocouples to incorporate the changes

resulting from adoption of the new temperature scale, IPTS 68, as well as those resulting from the inclusion of the most up-to-date test data. With the approval of the Director of the Bureau, a special advisory committee has been created to counsel with Bureau personnel in this project. The needs of science and industry as seen by ASTM are being presented to the Bureau through this vehicle.

Subcommittee V on Liquid-in-Glass Thermometers (L. C. Liberatore, chairman) has taken action to incorporate the fixed points of IPTS 68 into Method E 77. By this action the temperature scale used by the ASTM will be brought into line with the latest revision of the international temperature scale. A revision of Method E 77 is being undertaken to incorporate suggestions received from ANSI Committee B88 on Calibration of Instruments. These changes will bring the method more into accord with current practice and pave the way for its adoption as an American National Standard for calibration.

Cooperative efforts are underway with ISO/TC 48, Laboratory Apparatus and Related Glassware, and the Institute of Petroleum, IP, to modify some of the basic specification criteria for liquid-in-glass thermometers and arrive at internationally acceptable requirements. This is a major undertaking and involves significant reconciliation of American and European design philosophies.

Subcommittee VI on Acoustical Thermometers (L. C. Lynnworth, chairman) is planning a workshop for the annual meeting in Toronto. This will be a continuation of the information exchange conducted at the organization meeting in April 1969.

Respectfully submitted on behalf of the committee,

R. D. THOMPSON,
Chairman

H. J. GREENBERG,
Secretary

REPORT OF COMMITTEE E-21 ON SPACE SIMULATION

Committee E-21 on Space Simulation and its subcommittees met on Sept. 11 and 12, 1969, in Los Angeles, Calif. In addition, the Executive Committee met on March 17, 1970, in Gaithersburg, Md. Working groups and sections also met at other times during the year. The second Thermophysics Roundtable was held in conjunction with the September meeting.

The Joint Committee on Solar Simulation was organized in October 1969. It is sponsored by Committee E-21, the Solar Simulation Committee of the Institute of Environmental Sciences, and the Ground Test Committee of the American Institute of Aeronautics and Astronautics. The Joint Committee will operate as Subcommittee E21.07.

A special committee was appointed by the chairman to study E-21 organization and to make recommendations for improvement.

Committee E-21, the Institute of Environmental Sciences, and the American Institute of Aeronautics and Astronautics were joint sponsors of the Fourth Space Simulation Conference which was held in Los Angeles, Calif., from Sept. 8 to 10, 1969. The AIAA was responsible for the administration of the Conference.

The Fifth Space Simulation Conference will be held in Gaithersburg, Md., at the National Bureau of Standards from Sept. 14 to 16, 1970. ASTM will be responsible for the conference administration.

The following were elected to serve Committee E-21 as officers and members-at-large for two-year terms beginning June 26, 1970:

Chairman, J. C. Richmond

First Vice-Chairman, E. N. Borson

Second Vice-Chairman, R. L. Hammel

Secretary, R. B. Williams

Members-at-Large: D. E. Anderson, D. F.

Farnsworth, R. W. Johnson, F. J. Koubek, D. F. Stevenson

Committee E-21 presently consists of 117 voting members and 11 consulting members.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee E-21 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which were accepted by the Society effective on the dates indicated:

Adoption of Tentatives as Standard Without Revision:

E 285 - 70 (formerly E 285 - 65 T), Method for Oxyacetylene Ablation Testing of Thermal Insulation Materials (Subcommittee E 21.06) (effective Feb. 27, 1970)

Adoption of Tentatives as Standard with Revision:

E 296 - 70 (formerly E 296 - 66 T), Recommended Practices for Ionization Gage Application to Space Simulators (Subcommittee E 21.04) (effective Feb. 27, 1970)

These recommended practices were revised to update them with current practices.

E 297 - 70 (formerly E 297 - 66 T), Methods for Calibrating Ionization Vacuum Gage Tubes (Subcommittee E 21.04) (effective Feb. 27, 1970)

These methods were revised to update them with current practices.

The new standards appear in the 1970 *Annual Book of ASTM Standards*, Part 30.

REPORT OF COMMITTEE E-21

ACTIVITIES OF SUBCOMMITTEES

Subcommittee E21.07, Joint Committee on Solar Simulation (T. L. Hershey and C. H. Duncan, cochairman):

Task 1 is a recommended practice on Solar Simulation for Spacecraft Thermal Balance Testing. This recommended practice will define terms, review the basic technology, reference sources of more detailed information, and reference applicable ASTM and other standards. The proposed recommended practice is intended to provide guidance to spacecraft systems engineers, designers, and test engineers.

Task 2 is an engineering standard for Solar Spectral and Total Solar Irradiance Outside the Earth's Atmosphere (Air Mass Zero). This standard is based on recent NASA experiments and data from other nations.

Additional tasks which are now under discussion include radiometric measurement and calibration standards. These activities are being coordinated with E21.06.01 on Thermal Radiation Properties of Materials.

Subcommittee E21.06, Materials Test Methods (R. L. Hammel, chairman), was active during the year as outlined below.

Section 1 on Thermal Radiative Properties of Materials—M. J. Brown of EMR has tendered his resignation as section chairman due to a new job assignment. Don Steverson of AFML replaces Mr. Brown as the chairman. Progress in several standards continues.

Section 2 on Optical Properties of Materials—Full section status has been reestablished for this activity under E. N. Borson of Aerospace. Particular emphasis on the contamination effects on optical properties of materials is being addressed. A number of characterization methods are being considered.

Section 3 on Ablative Properties of Materials—The section continues as a highly structural and effective organization under the chairmanship of R. Bierman. Several draft methods have been processed this past year. The section held two meetings during the year: on Nov. 4 to 5, 1969, in Albuquerque, N. M., and April 2 to 3, 1970, in Denver, Colo.

Section 4 on Weight Loss of Materials—The section has deactivated. A draft Recommended Practice for the Measurement and Reporting of the Weight Loss of Materials in Vacuum has been balloted. Additional action on this document is being handled by Section 2.

Section 5 on Environmental Effects of Materials—T. L. Willard of Honeywell has resigned as chairman being replaced by R. L. Munson of NASA White Sands. An odor test method has been submitted for ballot. Procedures for flash point and propagation rate determination are under review in support of the flammability properties of materials.

Section 6 on Adhesion of Materials—The section has attempted to outline pertinent technologies or considerations in support of testing in this area. A very low level of effort and lack of specific tasks has severely paced progress of the section in the past two years. An attempt is being made to develop specific tasks although no concrete results have been achieved to date.

Respectfully submitted on behalf of the committee.

R. W. JOHNSON,
Chairman

R. B. WILLIAMS,
Secretary

REPORT OF COMMITTEE E-23 ON RESINOGRAPHY

Committee E-23 on Resinography met once during the year, on June 25, 1969, in Atlantic City, N. J.

The membership of the committee, which is not classified, consists of 36 members, 27 voting and 9 consulting members.

The officers elected for the ensuing two-year term are as follows:

Chairman, T. G. Rochow

Vice-Chairman, G. G. Cocks

General Secretary, T. R. Elkinson

Membership Secretary, Ruth Giuffria

All future meetings of E-23 and its subcommittees will be held during the Inter-Micro Symposia in Chicago, Ill., and alternating with the New York Microscopical

Society Symposium in New York, N. Y. This change was proposed in order to ensure maximum attendance at the committee meetings.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee I on Nomenclature and Definitions—The two definitions "resin" and "structure," were approved by committee ballot, and submitted to the Society for approval.

Respectfully submitted on behalf of the committee,

R. E. AMREIN,
Chairman

M. A. SIEMINSKI,
Secretary

REPORT OF COMMITTEE E-24 ON FRACTURE TESTING OF METALS

Committee E-24 on Fracture Testing of Metals held two meetings during the year: at NASA, Lewis Research Center, Cleveland, Ohio, on Sept. 25, 1969, and at ASTM Headquarters on March 26, 1970. The subcommittees met on preceeding days at the same locations.

The committee consists of 52 members, three of which are corresponding members (from European countries) who were approved for committee membership during the past year.

Change in Scope of Committee E-24:

By vote of the members of the committee in attendance at the meeting on Sept. 25, 1969, Article II of the bylaws on scope, Section 1, Part (a) was changed to: "Promoting research and development on methods for appraisal of the fracture of metals." Part (b) was changed to: "Developing recommended practices, methods of test, definitions, and nomenclature for fracture testing of metals, exclusive of fatigue testing."

Restructuring of Committee E-24:

Because of changing needs of the committee, the chairman appointed a study group on Sept. 25, 1969, to consider suggestions of committee members for changes in committee organization in order to improve the effectiveness of the subcommittees and task groups. The study group had several meetings and after considering many suggestions for reorganization submitted a study group report at the meeting of the committee on March 26, 1970. The report contained a number of recommendations that may be adopted at the discretion of the chairman. Recommendation regarding reorganization of the subcommittees was as follows:

Subcommittee I—Fracture Mechanics Test Methods

Subcommittee II—Materials Structures and Fractography

Subcommittee III—Dynamic Test Methods

Subcommittee IV—Subcritical Crack Growth

Subcommittee V—Nomenclature and Definitions

Subcommittee VI—Applications

The chairman asked the present subcommittee chairmen to draft scopes that would apply to their subcommittees under the new titles. The study group's report recommended changes in meeting schedules and a policy for scheduling West Coast meetings. Plans for future meetings have been made to comply with these recommendations. Further implementation of recommendations of the study group will require additional time and study by the chairman and members of the committee.

Liaison With Other Committees on Fracture Testing:

Committee E-24 is continuing to expand its liaison activities with other ASTM committees and committees of other technical groups concerned with fracture testing and fracture problems. Because of the wide interest in these problems and the various approaches being considered in evaluating these problems, it is highly desirable to maintain liaison with all of these groups. Expanded liaison effort will help all groups to take advantage of the study and research that is being conducted to minimize these problems.

Sponsorship of Symposia at Annual Meeting:

Committee E-24 is co-sponsor of a symposium on fracture toughness testing at cryo-

REPORT OF COMMITTEE E-24

genic temperatures to be presented at the ASTM Annual Meeting on June 24, 1970, in Toronto, Canada. The Subcommittee on Fractography also is sponsoring a symposium which will be on electron microfractography at the June 1970 Annual Meeting.

The slate of candidates for the two-year period starting June 1970 was presented to the committee at its meeting on Sept. 25, 1969, and submitted to letter ballot on Dec. 3, 1969. As a result of the letter ballot, these officers were elected for the two-year term June 1970 to June 1972:

Chairman, R. H. Heyer

Vice-Chairman, J. E. Sawley

Membership Secretary, J. M. Hodge

The candidate for secretary declined the position and R. J. Goode was appointed secretary.

RECOMMENDATIONS ACCEPTED BY THE COMMITTEE ON STANDARDS

Subsequent to the 1969 annual report, Committee E-24 presented to the Society through the Committee on Standards the following recommendations which became effective March 19, 1970.

E 399 - 70 T, Method of Test for Plane-Strain Fracture Toughness of Metallic Materials (subcommittee I)

This method is for reference on procurement specifications and design applications.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee I on High-Strength Materials (G. E. Pellissier, chairman)—The main activity of this subcommittee has been the preparation and revision of the Method E 399, Test for Plane-Strain Fracture Toughness of Metallic Materials and Method E 338, Test for Sharp-Notch Tension Testing of High-Strength Sheet Materials. A round-robin program is nearing completion on a study by nine laboratories using compact K_{Ic} tension specimens of several high-strength alloys to determine K_{Ic} values by the procedure in Method E 399. Under the restructuring proposal, this will be the Subcommittee on Fracture Mechanics Test Methods.

A task group on thin-section plane-stress fracture testing has been organized and is attempting to get additional members from the air-frame industry to assist in establishing

programs on fracture testing of precracked panels.

A Task Group on Fracture Mechanics is continuing to study problems in stress analysis in plane-strain, mixed-mode, and plane-stress fracturing of metals.

There are 48 members of Subcommittee I.

Subcommittee II on Fractography (A. J. Brothers, chairman)—ASTM STP 453 on *Electron Microfractography* includes the papers that were presented at a symposium sponsored by Subcommittee II at the Annual Meeting in June 1969. The symposium on Applications of Electron Microfractography to be presented at the Annual Meeting on June 23, 1970, also is being sponsored by this subcommittee. Four task groups of this subcommittee have been proposed:

- (1) Subcritical crack growth,
- (2) Transmission microscopy,
- (3) Failure analysis, and
- (4) Stretch zone analysis.

The task group on subcritical crack growth is an intersubcommittee task group with Subcommittee IV and is concerned with crack growth in a 10 Ni steel.

Under the restructuring proposal, Subcommittee II on Materials Structures and Fractography will be an advisory subcommittee. There are 35 members of this subcommittee.

Subcommittee III on Fracture Testing of Intermediate-Strength Materials (J. M. Krafft, chairman) is now primarily concerned with dynamic methods of fracture toughness testing to establish dynamic plane-strain data or empirical data on toughness such as the drop-weight test. An energy approach is being considered for the drop-weight test to supplement information on fracture appearance. This subcommittee was a co-sponsor of the symposium on impact testing at the ASTM Annual Meeting in June 1969.

Under the restructuring proposal, this will be Subcommittee III on Dynamic Test Methods. There are 58 members of this subcommittee.

Subcommittee IV on Subcritical Crack Growth (R. P. Wei, chairman)—The primary activity of this subcommittee is to review current programs on subcritical flaw growth being conducted by members. These programs involve application of fracture me-

REPORT OF COMMITTEE E-24

chanics to slow flaw growth under conditions of static or cyclic loading and under various environments. One task group with representatives from Committee E-9 is considering methods for measurement of fatigue-crack growth. Another task group on sustained-load crack growth is being considered with members of Committee G-1.

Task Group on Fracture Testing of Beryllium (H. Conrad, chairman)—This task group was appointed by the chairman of the committee to investigate methods for determining the fracture toughness of beryllium,

because attempts to do this indicated that there were unusual problems associated with fracture testing of beryllium. This task group had one meeting and reported considerable progress in establishing test methods and K_{IC} data for beryllium.

Respectfully submitted on behalf of the committee,

R. H. HEYER,
Chairman

J. E. CAMPBELL,
Secretary

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REPORT OF COMMITTEE E-25 ON MICROSCOPY

Committee E-25 on Microscopy met once during the year on June 24, 1969, in Atlantic City, N. J.

The membership of the committee, which is not classified, is now 55, two having resigned during the year.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee 1 on Photomicrographic Materials (R. P. Loveland, chairman)—The chairman reported that his attempts to obtain reactions to an experimental photomicrographic emulsion designed especially for photomicrography had been largely unsuccessful. Only one or two reports had been returned.

Subcommittee 2 on Microscopes and Their Elements (O. W. Richards, chairman)—A letter ballot to adopt E 211 - 65 T, Specifications and Methods of Test for Cover Glasses and Glass Slides for Use in Microscopy, as a standard has resulted in a number of negative ballots which have not been resolved. Some of the ballots were returned by nonmembers of the committee who were apparently acting for members.

Subcommittee 4 on Definitions and Nomenclature (S. B. Newman, chairman)—Conflicting definitions from Definitions E 7, Terms Relating to Metallography, and from Definitions E 175, Terms Relating to Microscopy, were referred to the whole committee. There was a definite preference for a few of the terms from E 7, but no clearcut consensus was evident. It was decided to approach Committee E-4 with a proposal to appoint a

task group consisting of members of both E-4 and E-25 to work out a compromise.

Subcommittee 6 on Electron Microscopy (J. H. Reisner, chairman)—The chairman reported by letter that he had not achieved any significant agreement with proposals for either high or low magnification calibration standards, but would pursue the problem at the upcoming meeting of the Electron Microscopy Society.

Subcommittee 9 on Technical Programs (S. B. Newman, chairman)—The decision to make the photographic exhibit an annual feature was reported and members were urged to submit and solicit entries. Suggestions were also solicited for movies to be shown in conjunction with the exhibit.

Project on Index to ASTM Microscopical Literature (J. S. Bloxson, chairman)—In the absence of the chairman there was a general discussion of the future of the index. A suggestion was made to put the index on punch cards and issue it as a printout, however, before this could be undertaken another updating would be necessary and manpower be made available. Although reluctantly, the committee found that there was no available method for salvaging the extensive investment of time and resources that had gone into the index.

Respectfully submitted on behalf of the committee,

S. B. NEWMAN,
Chairman

G. G. COCKS,
Secretary

REPORT OF COMMITTEE E-26 ON DEEP DRAWING

Committee E-26 on Deep Drawing held meetings in Flint, Mich., on Nov. 12-13, 1969, and in Weirton, W. Va., on April 21-22, 1970. A Subcommittee on a Cooperative Study of Formability met in Detroit, Mich., on Oct. 1, 1969.

The committee consists of 44 voting members and 3 consulting members. Voting members are not classified as producer or consumer. The next meeting will be held in Boston, Mass., on Nov. 18, 19, 1970.

The following officers were elected by letter ballot dated Dec. 12, 1969, for a two-year term commencing in June 1970.

Chairman, S. P. Keeler

Vice Chairman, W. E. Johnson

Secretary, J. R. Newby

Executive Committee, P. G. Nelson, Immediate Past Chairman, D. F. Eary, D. L. Harper and G. L. Montgomery

MEETINGS

The interchange of ideas and methods of testing for sheet metal formability are major functions of the meetings which serve as forums for producers and fabricators.

The two-day meetings twice each year include regular business and subcommittee reports plus lectures, in-depth discussions of specific topics, off-the-record research reports, and tours of the sponsor's research or production facilities.

The November 1969 meeting featured a tour of the Chevrolet Die Engineering Center, Plastic Moulding Plant, and a Synchronized Press Line. A lecture on forming characteristics for various production type parts was given by D. F. Eary, General Motors Institute, with examples showing deformation modes in specific types of parts.

The April 1970 meeting was sponsored by the National Steel Corp. The first day activities included four technical papers on the

subjects: Ion Surface Analyzer, Influence of r and n on Sheet Drawability, Circular Grid System, and Relation of Strain Markings to Yield Point Elongation. A tour of the National Steel Research Center, basic-oxygen furnace, vacuum degasser, and continuous slab caster was made in the afternoon. The business meeting, subcommittee reports, and research reviews were held on the second day.

Committee E-26 is the official representative of the United States and Canada to the International Deep Drawing Research Group (IDDRG). This group has annual meetings of three Working Groups I. Processes, II. Materials, and III. Tests. The 1969 meetings were held in Madrid, Spain, in June. A colloquium, the working group meetings, and the biennial meeting of the General Council, are scheduled for September 1970 in Tokyo, Japan.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee on Recommended Test Method for r and n (K. F. James, chairman) was formed to work with Committee E-28. Present policy of Committee E-26 does not permit the writing of specifications or test methods. This is to permit members' participation in the cooperative functions free from their employer's restrictions on such writings. The committee, however, is contributing its expertise in cooperation with Committee E-28 to prepare standard methods for determining the plastic-strain ratio and strain-hardening capacity in sheet metals.

Subcommittee on Definitions for Formability Terms (B. S. Levy, chairman)—Committee E-26 has undertaken the definition of terms specifically related to sheet metal formability which have not previously been de-

REPORT OF COMMITTEE E-26

finished by Committee E-8. A tentative list of 285 terms has been prepared and distributed to members for consideration.

Subcommittee on Cooperative Program
(W. F. Barclay, chairman)—A program to use newer sheet metal test methods in conjunction with production part evaluation by the circular grid system was in progress. The materials, including hot- and cold-rolled, rimmed and aluminum killed, heavy-gage and light-gage sheet steels, have been produced and distributed. Testing is currently being done and the evaluation is expected to be completed during the fall of 1970.

Subcommittee on Olsen Ductility Testing

(J. Millane, chairman)—The Olsen ductility test has been in use as a production test for formability for over 80 years, yet the procedure for performing the test has never been standardized. An attempt to do this in 1930-1934 was reported in *ASTM Proceedings* Vol 38, Part I, p. 490. A reevaluation of the test is being made to determine if it or a similar test may be currently standardized.

Respectfully submitted on behalf of the committee,

S. P. KEELER,
Chairman

J. R. NEWBY,
Secretary

REPORT OF COMMITTEE E-27 ON HAZARD POTENTIAL OF CHEMICALS

Committee E-27 on Hazard Potential of Chemicals and its subcommittees held two meetings during the year: on Oct. 1 to 3, 1969, in Philadelphia, Pa., and on Feb. 19 to 20, 1970, in Atlanta, Ga.

The committee consists of 58 voting members, 11 consulting members, and 12 alternates.

The committee notes with regret the death of member W. J. Sweet.

The following officers were elected for a term of two years:

Chairman, R. D. Coffee
Vice-Chairman, C. J. Grelecki
Secretary, J. P. Flynn

ACTIVITIES OF SUBCOMMITTEES

Subcommittee E27.01 on Editorial and Nomenclature (W. H. Doyle, chairman) served as a consulting group to aid other subcommittees with editorial and nomenclature problems and has begun compilation of a glossary of definitions of terms used by the committee.

Subcommittee E27.02 on Thermal Stability Testing (A. Wilson, chairman)—There are three active task groups: TG1 on Differential Thermal and Thermogravimetric Methods, TG2 on Constant Temperature Stability, and TG3 on Confinement Testing.

Task Group 2 is developing a test method which will supplement differential thermal analysis information. Objective of the test is to determine the highest safe storage temperature for a chemical. An electrically heated apparatus accommodating two samples has been constructed. Agreement has been reached as to parameters to be studied during method development.

Task Group 3 has a draft method which is expected to be balloted upon soon as a tentative standard.

Subcommittee E27.03 on Condensed Phase Reactions (W. G. Sykes, chairman) is actively working in two areas: (1) on the development of an instrumented impact test and (2) on a computational approach to hazard evaluation. Comparison of results and testing is being carried on in several laboratories for the instrumented impact program.

Task Group A on Computational Approaches to Hazard Evaluation (W. H. Seaton, chairman) is evaluating two computer programs for their ability to estimate the "energy hazard potential" of chemicals and chemical mixtures and to estimate the characteristics of an explosion. Both programs are based on classical thermodynamics. Program TIGER, which was developed by the Army Material Command Explosive Research Program, predicts the composition, the pressure, and the temperature at equilibrium. Program CHETAH computes the maximum thermodynamically possible energy release. CHETAH also computes the thermodynamic properties of compounds from structural information and is, therefore, able to provide much of the input required by TIGER. Version I of CHETAH has been used to screen proposed computable "energy hazard potential" test criteria. Three suitable criteria have been devised and will be included in the final version of CHETAH. The program will be revised extensively to improve the accuracy of its thermodynamic property estimates and to simplify the coding of input information. TIGER is not being altered, but its output will be evaluated for its usefulness in estimating "energy hazard potential."

Subcommittee E-27.04 on Flammability and Ignitability of Liquid Chemicals (J. M. Kuchta, chairman)—Four task groups are

REPORT OF COMMITTEE E-27

working on drafts of standard test methods to be proposed for the hazard evaluation of liquid or gaseous chemicals.

Task Group on Autoignition Temperatures (J. E. Johnson, chairman) is modifying ASTM D 2155 for minimum autoignition temperature determinations.

Task Group on Flammability Limits (G. W. Armstrong) is working on a limit of flammability test method, for which no ASTM standard exists.

Task Group on Spark Ignition Energies (E. L. Litchfield, chairman) is revising a draft of a minimum ignition energy test based on a Bureau of Mines Method.

Task Group on Flash Points (J. J. Wheeler, chairman) has completed a draft of a proposed method of test for flash point of chemicals by closed-cup methods and plans are being made for a round robin test to develop precision data.

Task Group on Spontaneous Heating Temperatures (J. F. Breen, chairman) has not decided on a particular test method although an adiabatic type is desired.

Subcommittee E-27.05 on Dusts, Mists and Vapors (J. P. Gillis, chairman) has organized three task groups whose initial efforts will be concentrated on dusts: TG 1 on Maximum Pressure, Rates of Pressure Rise and Inerting (R. F. Schwab, chairman), TG 2 on Resistivity and Static Generation (D. H. Way, chairman), and TG 3 on Minimum Ignition Energy and Ignition Temperature (A. Santos, chairman)

Respectfully submitted on behalf of the committee,

R. D. COFFEE,
Chairman

R. G. WHITE,
Secretary

REPORT OF COMMITTEE E-28 ON MECHANICAL TESTING

The organization meeting of Committee E-28 on Mechanical Testing was held Nov. 21, 1969, at ASTM Headquarters, Philadelphia, Pa. At this meeting the scope and by-laws of the new committee were approved, subject to confirming letter ballot, and officers were elected to serve until the close of the 1970 Annual Meeting of the Society. A committee organization structure was approved which incorporated the former Subcommittees 1, 3, 4, 5, 6, 7, 8, 25, 30, and 33 of Committee E-1 on Methods of Testing. Arrangements have been made for the first working meeting of the committee at the

1970 Annual Meeting of the Society in Toronto, Canada.

The following officers have been elected from the two-year term from June 1970 to June 1972:

Chairman, L. K. Irwin
Vice-Chairman, Alfred Fox
Secretary, J. A. Millane

Respectfully submitted on behalf of the committee,

L. K. IRWIN,
Chairman

J. A. MILLANE,
Secretary

REPORT OF COMMITTEE E-29 ON PARTICLE SIZE MEASUREMENT

The organization meeting of Committee E-29 on Particle Size Measurement was held Oct. 22, 1969, at ASTM Headquarters, Philadelphia, Pa. At this meeting the scope and bylaws of the new committee were approved subject to confirming letter ballot, and officers were elected to serve until the close of the 1970 Annual Meeting of the Society. A committee organization structure was approved which incorporated the former Subcommittees 10 and 11 of Committee E-1 on Methods of Testing. Arrangements have been made for the first working meeting of the committee at the 1970 Annual Meeting of the Society in Toronto, Canada.

The following officers and member-at-large of the Executive Committee have been elected for the two-year term from June 1970 to June 1972:

Chairman, A. E. Reed

Vice-Chairman, M. R. Jackson

Secretary, Reginald Davies

Members-at-Large: Roger Loveland, Delmar L. Bloem, and Kenneth H. Colville

Respectfully submitted on behalf of the committee,

A. E. REED,
Chairman

R. K. KIRBY,
Secretary

REPORT OF COMMITTEE F-1 ON MATERIALS FOR ELECTRON DEVICES AND MICROELECTRONICS

Committee F-1 on Materials for Electron Devices and Microelectronics held three meetings during this year; on Sept. 23 to 25, 1969, in St. Louis, Mo., on Feb. 10 to 12, 1970, at Atlanta, Ga., and on June 2-4, 1970, at the National Bureau of Standards.

The committee consists of 138 voting members of whom 60 are classified as producers, 43 as consumers and 35 as general interest members. The total number of individuals on the committee roster is 333.

As a result of the continuing planning effort, a new simplified committee name (that is, Committee on Electronics) and a broader scope were balloted in the committee. This more generic name resulted from the assumption at the request of the Board of Directors of the activities of Committee C-25 on Ceramics for Electronics and the resultant increase in the number and activities of the subcommittees and also from the planned expansion of activity into methods of tests for devices and products. The balloted new scope includes this new range of materials and products.

The internal committee organization reflects the following changes;

Dr. W. B. Burford, III replaced P. P. Prichett as vice-chairman,

J. A. Kohanski replaced W. E. Buescher as chairman of Subcommittee F01.01,

E. A. Miller replaced P. P. Prichett as chairman of Subcommittee F01.03, and

H. E. Powell replaced M. S. Jones as chairman of Subcommittee F01.07.

The activities of Subcommittee F01.09 on Materials Analysis were absorbed into Subcommittee F01.05 and Subcommittee F01.09 was reconstituted to work on Magnetic Materials under the chairmanship of J. A. Dalke. Furthermore, it is planned to sub-

divide Subcommittee F01.07 with 20 active projects during the summer months.

The committee worked diligently to plan and promote a Symposium on Silicon Device Processing on June 2 and 3, 1970, at the National Bureau of Standards which emphasized the interdependence of measurements, techniques, facilities, and materials as they relate the silicon device sciences and technologies. Seven sessions were held on aspects of diffusion, epitaxy, surface preparation, and processing operations.

Two committee members, W. M. Bullis and R. I. Scace, published a paper in the *Proceedings* of the IEEE, September 1969, issue on "Measurement Standards for Integrated Circuit Processing" emphasizing the need for measurement methods and the activity of the committee to satisfy this need. The paper details the development and maintenance of methods of measurement and lists present documents and drafts applicable to this industry.

Committee certificates expressing recognition of past services were issued to A. P. Haase, Past Chairman, D. E. Koontz and P. P. Prichett, Past Vice-Chairmen, and also to E. A. Thurber posthumously for his many committee and Society accomplishments.

The elected officers for the two-year term beginning July 1, 1970, are;

Chairman, R. I. Scace
Vice Chairman, W. B. Burford, III
Secretary, C. P. Marsden
Membership Secretary, C. F. Bolton (Mrs.)

RECOMMENDATIONS ACCEPTED BY THE COMMITTEE ON STANDARDS

Subsequent to the 1969 annual report, Committee F-1 presented to the Society through the Committee on Standards the

REPORT OF COMMITTEE F-1

following recommendations which became effective on the dates indicated:

New Tentatives:

F 54 - 69 T, Recommended Practice for Determining Multiple Photomask Registration (Subcommittee F01.05) (effective Nov. 7, 1969)

The advanced technology required an accepted practice both in the processing applications and for photomask procurement. This practice together with other pending documents will provide industry with urgently needed, uniform guides.

F 110 - 69 T, Test for Thickness of Diffused Layers in Silicon by the Angle Lapping and Staining Techniques (Subcommittee F01.04) (effective Sept. 19, 1969)

This method provides a standard procedure for measuring the depth of diffusion in silicon, normally 1 to 25 μm .

F 111 - 69 T, Recommended Practice for Determining Barium Yield, Getter Gas Content, and Getter Sorption Capacity for Barium Flash Getters (Subcommittee F01.01) (effective Sept. 19, 1969)

This practice was developed to facilitate commercial procurement of this item.

F 120 - 70 T, Recommended Practice for Infrared Absorption Analysis of Impurities in Single Crystal Semiconductor Materials (Subcommittee F01.04) (effective June 12, 1970)

Two methods, that is, difference and air reference, are described with the necessary precautions for determining the infrared absorption and therefrom the impurity concentration. The relation between the intensity of the absorption bands and the actual impurity concentration is established by a calibration curve resulting from round robin tests and is used to determine the impurity concentration of the sample.

F 121 - 70 T, Test for Interstitial Oxygen Content in Silicon (Subcommittee F01.04) (effective June 12, 1970)

F 122 - 70 T, Test for Interstitial Oxygen in Germanium (Subcommittee F01.04) (effective June 12, 1970)

These methods detail the measurement requirements and provide the calibration constants for determining the amount of interstitial oxygen in silicon and germanium respectively.

F 123 - 70 T, Test for Substitutional Carbon in Silicon (Subcommittee F01.04) (effective June 12, 1970)

This method details the measurement for substitutional carbon in silicon.

All of these new tentatives will appear in the 1970 *Annual Book of ASTM Standards*, Part 8.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee F-1 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which became effective on the dates indicated:

Adoption of Tentatives as Standard without Revision:

F 9 - 69 (formerly F 9 - 66 T), Specification for Round Wire for Use as Grid Siderods in Electron Tubes (Subcommittee F01.03) (effective Oct. 17, 1969)

F 10 - 69 (formerly F 10 - 67 T), Specification for Miniature Electron Tube Leads (Subcommittee F01.03) (effective Oct. 17, 1969)

F 52 - 69 (formerly F 52 - 65 T), Test for Silting Index of Fluids for Processing Electron and Microelectronic Devices (Subcommittee F01.10) (effective Oct. 17, 1969)

F 72 - 69 (formerly F 72 - 66 T), Specification for Gold Wire for Semiconductor Lead-Bonding (Subcommittee F01.03) (effective Oct. 17, 1969)

F 77 - 69 (formerly F 77 - 67 T), Test for Apparent Density of Ceramics for Electron Device and Semiconductor Application (Subcommittee F01.07) (effective Oct. 17, 1969)

F 85 - 69 (formerly F 85 - 67 T), Recommended Practice for Nomenclature for Wire Leads Used as Conductors in Elec-

REPORT OF COMMITTEE F-1

tron Tubes (Subcommittee F01.03) (effective Oct. 17, 1969)

Adoption of Tentative as Standard with Revision:

F 50 - 69 (formerly F 50 - 65 T), Test for Continuous Counting and Sizing Airborne Particles in Dust-Controlled Areas by the Light-Scattering Principle (for Electronic and Similar Applications) (Subcommittee F01.10) (effective Nov. 14, 1969)

This method was revised to bring it to the present state of the technology and make it applicable to actual practice in industry.

Revision of Standard:

F 15 - 69 (formerly F 15 - 68), Specification for Iron-Nickel-Cobalt Sealing Alloy (Subcommittee F01.03) (effective June 26, 1969)

Reference has been added to F 14, Recommended Practice for Making and Testing Reference Glass-Metal Bead-Seal.

Withdrawal of Tentative:

F 33 - 63 T, Recommended Practice for Determination of Gas Content of Strip Materials (Subcommittee F01.03) (effective Jan. 7, 1970). Having been published for one additional year after intent to withdraw without replacement, this tentative was withdrawn.

All of the revised standards will appear in the 1970 *Annual Book of ASTM Standards*, Part 8.

AMERICAN NATIONAL STANDARDS

The following standards have been approved during the year as American National Standards by the American National Standards Institute:

F 1 - 68, Z173.1-1969
F 2 - 68, Z173.2-1969
F 11 - 66, Z173.3-1969
F 12 - 68, Z173.4-1969
F 14 - 68, Z173.5-1969
F 25 - 68, Z173.6-1969
F 29 - 68, Z173.7-1969
F 32 - 68, Z173.8-1969
F 35 - 68, Z173.9-1969
F 40 - 68, Z173.10-1969
F 41 - 68, Z173.11-1969

F 44 - 68, Z173.12-1969
F 47 - 68, Z173.13-1969
F 48 - 68, Z173.14-1969
F 49 - 68, Z173.15-1969
F 51 - 68, Z173.16-1969
F 53 - 68, Z173.17-1969
F 58 - 68, Z173.18-1969
F 59 - 68, Z173.19-1969
F 60 - 68, Z173.20-1969
F 63 - 68, Z173.21-1969
F 65 - 68, Z173.22-1969
F 69 - 68, Z173.23-1969
F 70 - 68, Z173.24-1969
F 71 - 68, Z173.25-1969
F 94 - 69, Z173.26-1969
F 78 - 66, Z173.27-1969
F 290 - 68, Z173.28-1969

This makes a total of 44 out of the 81 committee standards that have been accepted as American National Standards.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee F01.01 on Electron Tube Cathodes and Insulators (J. A. Kohanski, chairman)—As there is no new activity planned, the subcommittee plans only one meeting per year. At the June meeting, the comments on the committee ballot on Specification F 7, for Aluminum Oxide Powder, were resolved and the document was voted to submit to the Committee on Standards. The subcommittee has only one tentative remaining so that all future effort will be applied to updating the 21 standards.

Subcommittee F01.02 on Lasers and Laser Materials (J. D. Myers, chairman) has been extremely active during its two years of existence. Two documents, "Output of a Helium-Neon Laser" and "Slope Efficiency and Lasing Threshold of Ruby Laser Rods" have been committee balloted. Other documents in progress are "Beam Divergence for Optically Pumped Pulse Lasers, Fluorescent Lifetime of Neodymium and Erbium Lasers, Parallelism of Surfaces of Transparent Materials, and Surface Finish of Polished Crystal Optical Elements. Most of these are waiting the results of round-robin tests. Other effort was applied on new documents on extinction ratio, optic axis deviation, beam divergence, and active loss coefficient. The subcommittee held a Symposium on "Damage in Laser Glass" on June 20, 1969, the proceedings of which are published as *ASTM*

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STP 469. A similar Symposium on Laser Materials Damage was held June 24-25, 1970, at the National Bureau of Standards, Boulder, Colo.

Subcommittee F01.03 on Wrought Metallic Materials (E. A. Miller, chairman) is responsible for 28 standards and 4 tentatives. These documents have to do with the maintenance of quality standards in the manufacture and application of wrought metallic parts and strip from which they are made. They cover solid, plated, and clad metals.

Work is now proceeding on the scheduled review for revision, editorially or in substance where required, of eight existing specifications. Four newly proposed specifications are currently being worked on as follows: (1) Aluminum and Aluminum Alloy Wire for Semiconductor Use, (2) Semiconductor Lead Frames and Strip for Lead Frames, (3) Method for Testing for Earing, and (4) Flattened Wire and Ribbon Dimensional Tolerances.

Subcommittee F01.04 on Semiconductor Crystals (W. B. Burford, III chairman) rejuvenated the Sections on Optoelectronic and Thermoelectric Materials by appointing new chairmen (J. McNeely and J. D. Richards, respectively) and the effort appears to be productive in renewed activity. The Section on Impurities in Semiconductor Materials has completed and submitted to the Committee on Standards four documents which have been approved.

Committee ballots were held on updating revisions of Methods F43, Test for Resistivity of Semiconductors, Methods F 84, Test for Resistivity of Silicon Slices by the Four Point Probe, and Method F47, Test for Crystal Perfection of Silicon by Preferential Etch Technique.

Other activity consists of measuring the thickness of epitaxial layers by stacking fault and infrared, on the etch pit count, and lithium-drifting of germanium.

Subcommittee F01.05 on Semiconductor Processing Materials (J. W. Lampe, chairman)—The standardization efforts of the subcommittee deal primarily with materials used on semiconductors after the pure crystalline form has been established. As indicated by the list of documents given below, it is often necessary to likewise define the

equipment required for processing these materials.

To reach these objectives the following four sections have been active throughout this reporting period: Encapsulation, Materials for Diffusion and Epitaxy, Photomasking, and Material Analysis. In an attempt to attack the root of certain photomasking problems, a section on photoresist is being formed. The materials analysis section is not only involved with determining methods of chemical analysis for processing materials, but also for all materials with which Committee F-1 is concerned. Members of this section are active in Committee E-2 and are coordinating efforts.

Published documents being reviewed are physical properties of photoresist, definitions relating to photomasking, shrinkage stress in plastic embedment materials, and embedment stress on glass-encased components. The refinement of documents dealing with the following topics has received the greatest emphasis: dimensional and visual inspection of photomasks, compatibility of plastic encapsulants with integrated circuits, cleanness of silicon slices and of epitaxial deposition apparatus, hydrolytic stability of plastic encapsulants, purity of water for semiconductor processing, impurities in nitric acid, impurities in gases such as silicon tetrachloride and hydrogen chloride, and zirconium in electronic nickel.

Subcommittee F01.06 on Electrical Measurements (P. A. Schumann, Jr., chairman) met with the main body of Committee F-1 three times during the year. Sections were active on single-crystal semiconductor-conductivity type, resistivity, and epitaxial resistivity. By reorganization, the section on mechanical properties of semiconductor surfaces was added. These sections have recently been joined by new sections on single-crystal semiconductor-carrier mobility, lifetime, and the properties of dielectric films deposited on semiconductors.

The activity in conductivity type and resistivity has mainly been in improving present specifications. A new method has been proposed for the measurement of silicon conductivity type and is presently being considered. The section on resistivity has improved the four-point probe method of test, extending its range, and improving the pre-

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cision. Studies are underway on the two-point method of measuring ingot resistivity. A new method of measuring carrier concentration in semiconductors by determining the minimum as a function of wavelength in infrared reflectivity has been proposed and is currently being tested.

Epitaxial resistivity has been very active with three methods of test currently under investigation: differential diode capacitance, four-point probe on control wafer, and spreading resistance. There is a special task force on spreading resistance that is meeting between normal Subcommittee F01.06 meetings as well as along with them.

The mechanical properties of semiconductor surfaces has concentrated its efforts on gross dimensional specifications of wafers and a glossary of terms of specular defects found on silicon wafers.

The new section on mobility actually reactivated, has begun in order to meet the need for a standard and precise curve relating carrier concentration to resistivity. A section on dielectrics was organized to meet the increasing need for precise methods of test for silicon dioxide, silicon nitride, and related films. The lifetime section was reactivated in order to review and update the current standard method of test for lifetime.

Subcommittee F01.07 on Seals and Substrates (H. E. Powell, chairman) assumed the program of Subcommittee C25.04 on Electrical Insulating Materials during the year. Because of the growth of activity in the film program (both thick and thin) and on substrates, it is planned to split into two subcommittees in the coming year.

The subcommittee program includes activities in the following fields; mechanical properties of ceramic and glass surfaces, thick films, thin films, insulating materials for seals and substrates, standard seals, and leaks.

Subcommittee F01.09 on Magnetic Materials (J. A. Dalke, chairman) was organized during this year to continue the program of Subcommittee C25.06. The four documents: Methods C 524, C 525, C 526, and C 527 were balloted as Committee F-1 standards and three other documents that had not been published were balloted as Committee F-1 tentatives.

Subcommittee F01.10 on Diagnosis and

Optimization of Processing Materials and Facilities (D. E. Koontz, chairman) has essentially completed its reorganization from activities originally confined to estimation and control of contaminants to the broader aspects of electronic device processing which is reflected in its new title. This year the subcommittee sponsored four rather comprehensive committee reviews of specific topics as a basis for establishing active task forces to attain specific objectives. The topics included silicon oxides—their preparation, characterization, and evaluation; preparation and evaluation of silicon surfaces for oxidation or epitaxial deposition; measurement of water and solvent purity with specific ion-electrode techniques; and evaporation-rate technologies.

A new program to develop a standard oxidized silicon wafer to be used by consumers and producers as a vehicle for the evaluation of electron device processing materials, facilities, and processes was organized. The task forces assigned to this program include: Substrate Selection (R. R. Buckley, Bell Telephone Laboratories, chairman), Substrate Preoxidation Cleaning (D. Richman, RCA-Princeton, chairman), Oxidation (F. Mayer, RCA-Somerville, chairman), Annealing (R. R. Buckley, chairman), Electrical Properties (D. E. Koontz, Bell Telephone Laboratories, chairman), Mechanical Properties (John Fish, Texas Instruments, chairman) and Chemical Analysis (R. R. Buckley, chairman).

A second major program to develop the evaporation-rate technology to permit rapid nondestructive evaluation of semiconductor materials, processes, and facilities performance was organized. The task forces assigned to this program include: Estimation of Non-volatile Residues in Organic Solvents (John L. Anderson, Ametek, Inc., chairman), Determination of Chemical Activity of Silicon and Silicon Dioxide Surfaces, and Determination of Photoresist Residues. In addition there are five active task forces as follows: Estimation of Ionic Impurities in Electronic Grade Nonaqueous Processing Liquids (R. R. Buckley, chairman), Rapid, complete Measurement of Particulates on Clean Room Garments and Apparel (George E. Helmke, Bell Telephone Laboratories, chairman), Measurement of Sodium Ions in

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Electronic Grade Processing Chemicals and Ultrapure Electronic Grade Processing Water (V. C. Smith, Vaponics, Inc., chairman), and Estimation of Suspended Materials and Discrete Particulates in Electronic Grade Nonaqueous Processing Liquids (V. C. Smith, chairman), and Final Certification of a Proposed Test Procedure for Evaluation of Ultrasonic Cleaning Systems (T. J. Bulat, Bendix, chairman).

This subcommittee is dedicated to meeting the needs for higher degrees of materials purity, sophistication, and control of processing and facilities which are required for integrated circuits. Special attention is fo-

cused on the development and standardization of methods for measuring impurities and monitoring specific processes, facilities, and ambients.

Subcommittee F01.08 on Editorial Policies (J. C. French, chairman) reviewed the documents produced in the committee and organized to promote editorial review in the subcommittees.

Respectfully submitted on behalf of the committee,

R. I. SCACE,
Chairman

C. P. MARSDEN,
Secretary

REPORT OF COMMITTEE F-2 ON FLEXIBLE BARRIER MATERIALS

Committee F-2 on Flexible Barrier Materials held two meetings during the year: on Oct. 15 and 16, 1969, in St. Louis, Mo., and on March 18 and 19, 1970, in Cocoa Beach, Fla.

The committee consists of 54 members of whom 48 have voting privileges; 21 are classified as producers, 9 as consumers, 12 as general interest, 11 as dual consumer and producer, and 1 as dual producer and general interest.

The officers elected for the ensuing term of two years are as follows:

Chairman, S. G. Gilbert.

Vice-Chairman, K. W. Ninnemann.

Secretary, R. J. Hampson.

Membership Secretary, A. J. Castle.

Members-at-Large, C. J. B. Thor, and J. A. Yourtee.

Subcommittee 2.40 on Specifications was inactivated at the St. Louis meeting, and Subcommittee 2.60 on Classification of Flexible Barrier Materials was formed. L. I. Oetzel was elected chairman and J. A. Yourtee, secretary of Subcommittee 2.60.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee F-2 submitted the following recommendation to the Society for action under the Interim Procedure for Standards, which was accepted by the Society effective on the date indicated:

New Standard:

F 119 - 70, Test for Grease Penetration of Flexible Barrier Materials (Subcommittee 2.30) (effective May 29, 1970)

This method provides standard conditions for determining the rate of grease penetration of flexible barrier materials. Specimens of flexible barrier materials, uncreased or

creased by a standard procedure, are exposed on one side to grease contained in a weighted cotton patch. The time required to show a visual change in refractive index of a ground-glass back-up plate is measured.

The new standard will appear in the 1971 *Annual Book of ASTM Standards*, Part 15.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee 2.30 on Test Methods (D. L. Marcellus, chairman) is working on a method for determination of residual solvents in flexible barrier materials, that has been rewritten to resolve negative votes resulting from F-2 ballot prior to being reballoted by F-2. Preparation of a recommended practice for static dissipation testing of flexible barrier materials is planned because lack of equipment within Committee F-2 prevents round-robin testing and development of a standard test based on any one procedure. A second round robin on the Gelbo Flex Durability Test is in progress to resolve questions resulting from the first round robin and establish test precision for the materials to be run. A pinhole flex test method (CSI) is being written for round-robin testing. An organoleptic method for testing odor has been sent to Committee E-18 on Sensory Evaluation of Materials and Products for review prior to Committee F-2 ballot.

Subcommittee 2.60 on Classification of Flexible Barrier Materials (L. I. Oetzel, chairman) is working on developing a cell classification for flexible barrier materials based on end-use properties and will issue a questionnaire asking for guidance and active participation from interested people.

Respectfully submitted on behalf of the committee,

S. G. GILBERT,
Chairman

R. J. HAMPSON,
Secretary

REPORT OF COMMITTEE F-3 ON GASKETS

Committee F-3 on Gaskets met three times during the year: on April 21 to 23, 1969, at Peoria, Ill., on Nov. 3 to 5, 1969 in Williamsburg, Va., and on April 20 to 22, 1970, in Dearborn, Mich.

The committee consists of 57 voting members, of whom 26 are classified as producers, 15 as consumers, 15 as general interest, and 1 as an honorary member.

Harry Kapps was made an honorary member of Committee F-3 upon his retirement on Sept. 29, 1969. Mr. Kapps was chairman of SAE-ASTM Technical Committee on Automotive Rubber, Section X, ASTM F-3's predecessor until 1960.

The following officers were elected for the 1970-1972 term:

Chairman, G. G. Peck
Administrative Vice-Chairman, J. C. Toman
Executive Vice-Chairman, J. A. Laansma
Secretary, J. G. Claussen
Membership Secretary, A. K. Potepan
Members-at-Large, R. C. Bangs, F. E. Phillips, B. G. Staples, G. E. Becker, Jr., and D. Brown

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1970 annual report, Committee F-3 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which were accepted by the Society effective on the dates indicated:

New Standards:

F 112 - 70, Method of Test for Sealability of Enveloped Gaskets (Subcommittee 50) (effective April 13, 1970)

This method provides a means of evalu-

ating the sealing properties of enveloped gaskets for use with corrosion-resistant process equipment. Enveloped gaskets are described as gaskets having some corrosion-resistant covering over the internal area normally exposed to the corrosive environment. The shield material may be plastic (such as PTFE, etc.) or metal (such as tantalum, etc.). A resilient conformable filler is usually used inside the envelope.

F 118 - 70, Definitions of Terms Relating to Gaskets (Subcommittee 40) (effective April 13, 1970)

Definitions are provided for the terms Stress Relaxation, Creep, and Creep Relaxation.

Adoption of Tentative as Standard Without Revision:

F 64 - 69 (formerly F 64 - 66 T), Method of Test for Corrosive and Adhesive Effects of Gasket Materials on Metal Surfaces (Subcommittee 20) (effective July 18, 1969)

The new standards will appear in the 1971 Annual Book of ASTM Standards, Part 28. F 64 appears in the 1970 edition.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee F-3.20 on Nonmetallic Gaskets (R. C. Bangs, chairman) is composed of 6 sections, each concerned with updating and improving the standards for which it is responsible: (1) F-3.20.01, Stress Relaxation (F 38), (2) F-3.20.02, Sealability (F 37), (3) F-3.20.03, Corrosion and Adhesion (F 64), (4) F-3.20.04, Fast Quality Control (F 82), (5) F-3.20.05, Dimensional Stability, and (6) F-3.20.06, Test Methods Review.

The subcommittee is also responsible for

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F 36, Compressibility and Recovery of Gasket Materials, and F 39, Compressed Asbestos Sheet.

Subcommittee F-3.30 on Classification (F. E. Phillips, chairman) is editorially revising and updating the Classification System for Nonmetallic Gasket Materials, F 104.

Subcommittee F-3.40 on Liaison and Definitions (G. E. Becker, Jr., chairman) has submitted new Standard Definitions of Terms Relating to Gaskets, which was interim letter balloted in February.

Subcommittee F-3.50 on Corrosion Resistant Gaskets (B. G. Staples, chairman) has

submitted a new Method of Test for Sealability of Enveloped Gaskets, which was interim letter balloted in February.

Subcommittee F-3.60 on Metallic Composite Gaskets (D. Brown, chairman) has been conducting round-robin testing to develop a method of test for ignition loss, and for moisture loss.

Respectfully submitted on behalf of the committee,

L. F. CRYSTAL,
Chairman

J. A. LAANSMA,
Secretary

REPORT OF COMMITTEE F-4 ON SURGICAL IMPLANTS

Committee F-4 on Surgical Implants held two meetings during the year: Nov. 20, 1969, in Memphis, Tenn., and May 22, 1969, in Philadelphia, Pa. The committee consists of 96 members, of whom 36 are producers, 28 consumers, and 32 general interest members.

The officers elected for the ensuing term of two years are as follows:

Chairman, Horace Grover
Vice-Chairman, Paul Vermillion
Vice-Chairman, V. Frankel
Secretary, Vernon Scott
Membership Secretary, John Stanford

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1967 annual report, Committee F-4 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which became effective on the dates indicated:

New Standards:

F 114-69, Specification for Bone Screw Threads (Subcommittee F4.30) (effective Dec. 18, 1969)

This specification establishes the acceptable dimensions and tolerances for the threads of metal screws intended for use as surgical implants.

F 115-69, Specification for Bone Screw Heads (Subcommittee F4.30) (effective Dec. 18, 1969)

This specification establishes the acceptable dimensions and tolerances for the heads of metal screws intended for use as surgical implants.

F 116-69, Specification for Medical Screwdriver Bits (Subcommittee F4.30) (effective Dec. 19, 1969)

This specification establishes the acceptable dimensions and tolerances for the bits of screwdrivers to be used in inserting and removing metal screws used as surgical implants.

F 117-69, Method of Test for Driving Torque of Medical Bone Screws (Subcommittee F4.30) (effective Dec. 18, 1969)

This test method established the recommended type of test fixtures and specimen for determining the standardized insertion torque of self-tapping medical bone screws.

All of these new standards appear in the 1970 *Annual Book of ASTM Standards*, Part 7.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee F4.10 on Properties (S. Weisman, chairman) is working on soft tissue classification, and corrosion and mechanical properties of surgical implants. A task force on ceramic materials was set up and discussions were held at Memphis.

Subcommittee F4.20 on Compatibility (P. Laing, chairman) voted on a recommended practice for biological compatibility for metal surgical implants and will submit it to the Society. Task forces are active in both the metal and plastics area.

Subcommittee F4.30 on Applications (R. Elliot, chairman) is operating with over 15 task forces. New areas are intermedullary reeds, bone plates, pins and wires, intertrochanteric plates, drills and proximal femoral prosthesis. A recommended practice for handling implants in the operating area was also started. A neuro-Surgical Applications

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Task Force was also set up under J. T. McFadden.

Subcommittee F4.40 on Performance (V. Frankel, chairman)—A Task Force on Clinical Evaluation of Performance on Peritrochanteric Appliances was set up and several hospitals will be chosen for the research study. Funding will be handled through the PDR Council.

Subcommittee F4.50 on Specifications (S. Tyson, chairman) is readying for a ballot two new specifications on stainless strips, bars, sheet, and wire which have a different chemical composition and would be "special quality" for use in the manufacture of im-

plants. A specification task force is working on stainless steel suture wire.

PDR Council (H. Grover, chairman)—Dr. Martz agreed to chair a task force to write a committee manual on the activities of Committee F-4 which would include facts for members and which could be used as a public relations tool with other segments of the medical profession.

Respectfully submitted on behalf of the committee,

C. D. MARTZ,
Chairman

M. J. WATERMEIER,
Secretary

REPORT OF COMMITTEE F-5 ON BUSINESS COPY PRODUCTS

Committee F-5 on Business Copy Products held three meetings during the year: on June 25, 1969, in Atlantic City, N. J., on Oct. 8, 1969, in Kiamesha Lake, N. Y., and on Feb. 17, 1970, in New York, N. Y.

The committee consists of 63 members of whom 54 have voting privileges. Of the voting members, 7 are classified as consumers, 26 as producers, and 21 as general interest.

Final approval for a change of committee name and scope was received on Dec. 19, 1969, from ASTM's Board of Directors. The committee's new name is Committee F-5 on Business Copy Products. The new scope is, "The promotion of knowledge, stimulation of research and the development of methods of test, definitions and nomenclature and recommended practices relating to supplies used in imaging, copying and duplicating systems in the general area of business communications.

"This scope is intended to include those materials, processes and systems commonly used in the general area of business communications and the quality of images or copies produced. The scope is not intended to include conventional silver halide photography and systems not widely used in the business community.

"These activities will be coordinated with those of other related committees of ASTM and other organizations."

During the year, the executive committee regrettably accepted the resignation of J. F. McHugh from the office of membership secretary, although he continued his membership in the committee. T. J. Wirth, of Buyers Laboratories, Inc., was appointed to fill the vacant office.

The officers elected for the ensuing term of two years are as follows:

Chairman, H. W. Buck

Vice Chairmen, D. M. Davidson and T. J. Wirth

Recording Secretary, C. Huddleston

Membership Secretary, E. Zenie

Executive committee members are H. W. Buck (chairman), D. M. Davidson, C. Huddleston, J. Maksymiak, R. G. Reynolds, T. J. Wirth, and E. Zenie.

RECOMMENDATIONS ON STANDARDS ACCEPTED DURING THE YEAR BY THE SOCIETY UNDER THE INTERIM PROCEDURE

Subsequent to the 1969 annual report, Committee F-5 submitted the following recommendation to the Society for action under the Interim Procedure for Standards, which was accepted by the Society effective on the date indicated.

Adoption of Tentative as Standard with Revision:

F 254 - 69 (formerly F 254 - 65 T), Method of Test for Slip Resistance of Carbon Paper (Subcommittee II) (effective Dec. 19, 1969)

This method, which was designed to measure the resistance to slip of sheet carbons when they are interleaved with copy paper, was revised to include the option of using copy papers other than the standard paper for comparative purposes.

This new standard appears in the 1970 *Annual Book of ASTM Standards*, Part 15.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee I on Nomenclature and Definitions (R. G. Reynolds, chairman) held two meetings during the year. Scopes for three task forces were approved during the year for the following areas: carbon paper and inked ribbons, electrostatic copy products, and optical character recognition. Work was

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begun in the three task forces in close collaboration with Committee E-8.

Subcommittee II on Carbon Paper and Inked Ribbons (J. W. Nelson, chairman) held three meetings during the year and is actively working in the following areas through the respective task forces:

Task Force 1 on the Development of a Typewriter Method for Preparing Test Images (J. J. Forsythe, chairman). At the meeting on Feb. 17, 1970, Mr. Forsythe explained that a change in the nature of his work made it essential that he resign as chairman of this task force. His resignation was accepted with regret. It was decided to refer the basic work required for the development of this test method to the Research Subcommittee. This was accepted by D. M. Davidson, chairman of Subcommittee III. When the basic studies have been completed, the data will be referred back to Subcommittee II for the development of a test procedure.

Task Force 2 on Specifications for Standard Test Papers (J. W. Nelson, acting chairman). The formal work of this task force was deactivated during the meeting of the subcommittee at the Concord Hotel, Oct. 8, 1969.

Task Force 3 on Cleanliness of Carbon Paper (D. M. Davidson, chairman) has been an active group and several round-robin tests to determine a proper test procedure have been completed but with inconclusive results. It was decided to refer the basic work required to the Research Subcommittee, and this action was acceptable to the chairman of the Research Subcommittee, D. M. Davidson. When the basic studies have been completed, the data will be referred back to Subcommittee II for the development of a test procedure.

Task Force 4 on Typewriter Wear Resistance (A. A. Carlson, chairman)—Work under the expanded scope of this task force has been primarily concerned with the development of a test procedure for the wear resistance of high-speed printer ribbons. Any test procedure involving the use of a high-speed printer will involve considerable cost, and the task force is currently trying to keep such costs at a minimum while developing a test procedure that will provide the required comparative data.

Task Force 5 on Erasability Test Methods (G. W. Skinner, chairman) has been one of the most active groups, and every attempt is being made to develop a suitable test procedure. Past work of the task force has been completely reviewed and new round-robin tests completed. Data obtained have been encouraging, but much remains to be developed before a test procedure can be submitted.

Task Force 6 on Slip Resistance of Carbon Paper (C. R. Coburn, chairman)—A slight modification of Method F 254-65 T to satisfy a negative ballot cleared this method for publication as a standard in 1970.

Task Force 7 on Method of Test for Curl Resistance of Carbon Paper (F. Hano, chairman) has increased its activity, and a new method for testing the curl of carbon paper was favorably considered during the last report of the group to Subcommittee II on Feb. 17, 1970. The procedure was prepared in the form required by ASTM and submitted for further consideration at the meeting of Subcommittee II in Toronto, at the 1970 Annual Meeting.

Task Force 8 on Smudge Resistance of Carbon Paper Images (E. Zenie, chairman)—The proposed method c² test was not continued in the 1970 Book of ASTM Standards. It was decided at the meeting of Subcommittee II on Feb. 17, 1970, to refer the basic work required for the development of a new method of test to the Research Subcommittee III. This was accepted by D. M. Davidson, chairman of Subcommittee III. When the basic studies have been completed, the data will be referred back to Subcommittee II for the development of a test procedure.

Task Force 9 on Determination of Ink Deposit on Carbon Papers and Inked Ribbons—Other than Fabric Types (G. Ehrhardt, chairman)—A revised method of test prepared in accordance with the requirements of ASTM was favorably received with only minor changes by Subcommittee II during the Feb. 17, 1970, meeting. The method has been submitted for review, and possible change in format, to ASTM. When returned, it will be submitted to ballot by Subcommittee II. Inclusion of the method in the 1971 Annual Book of ASTM Standards is anticipated.

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Subcommittee III on Research (D. M. Davidson, chairman) held three meetings during the year and is actively working in the following areas through the respective task forces:

Task Force 1 on Methods of Making Test Images (W. T. Barker, chairman) is reviewing various laboratory devices for possible selection of a standard.

Task Force 2 on Preparation of a Historical Monograph (chairman, W. E. Grady recently resigned) will continue the work under a new chairman.

In addition to task force activity, this subcommittee completed preparations for a symposium entitled *Evaluation Methods for Business Forms Copies*, which was presented at the 1970 Annual Meeting in Toronto. A total of six technical papers were presented.

Subcommittee IV on Electrostatic Copy Products (J. Maksymiak, chairman) held three meetings during the year. Six task forces have been proposed for Electrostatic Copy Products; Image Evaluation; Dry Toners and Developers, Liquid Toners and Developers, Paper, Copy Modifications, and Copy Handling and Storage. The first four are active and have approved scopes and task force chairmen. The remaining two are presently inactive but will be activated as soon as an interested task force can be formed. The general approach of all task forces is to investigate and develop test methods that would be useful to the purchaser.

Task Force 1 on Image Evaluation (J. Dughi, chairman)—The following scope was approved by the executive committee. "The development of test methods for evaluation of images produced by electrostatic business copy products." The initial approach is to screen existing test patterns now in use and survey the needs of the purchaser as to content of one or more test subjects. Emphasis on instrumentation for image evaluation will be minimized and a semi-subjective evaluation will be attempted.

Task Force 2 on Dry Toners and Developers (chairman open)—Samuel Hawk of Battelle Memorial Institute was appointed and approved as chairman but, due to work commitments, has recently withdrawn as chairman but will serve as a task force member. The approved scope of this task force

is, "The development of test methods for dry toners and developers used in electrostatic business copy products." Initial effort is to survey task force members as to existing significant test methods from the purchaser's standpoint.

Task Force 3 on Liquid Toners and Developers (I. Levinson, chairman)—The approved scope is, "The development of test methods for liquid toners and developers used in electrostatic business copy products." In the initial meeting of this task force on Feb. 15, 1970, it was agreed that a survey of test methods now in existence would be made by the task force members on subjects that would be of most use to the purchaser. Examples include solids determination, particle size, electrostatic field response, carrier liquid evaluation, toner to paper smear (cohesion and adhesion), and useful life. Test method effort on hazards and safety in storage and use will be deferred to a later date.

Task Force 4 on Paper (D. Hanson, chairman)—The approved scope of this group is, "To develop test methods for uncoated and photoconductive coated paper used in electrostatic business copy products." The initial effort in this task force is to survey the task force members to determine their specific interest in test method development. Possible areas of investigation include storage and shelf life, light fatigue and spectral response of photoconductive coated paper, solvent retention, intentional and unintentional marking of copy, and slip and curl resistance.

Other Task Forces—The two remaining task forces yet to be activated are those on copy modifications and copy handling and storage. Some of the test method development included in the proposals for these task forces have been assumed by Task Force 4. If the need and interest is generated in the future in possible methods not being actively investigated by other groups, new task forces will be formed.

The subcommittee has maintained close liaison with TAPPI's Reprography Committee and will continue to do so.

Respectfully submitted on behalf of the committee,

J. R. ROMIG,
Chairman

H. W. BUCK,
Recording Secretary

REPORT OF COMMITTEE F-6 ON RESILIENT FLOOR COVERINGS

Committee F-6 on Resilient Floor Coverings held three meetings during the year: on June 24, 1969, in Atlantic City, N. J., on Dec. 10, 1969, in Cincinnati, Ohio, and on April 15, 1970, in New York, N. Y.

The committee consists of 51 voting members, of whom 16 are classified as producers, 12 as consumers, and 23 as general interest members.

The following new officers were elected for a two-year term beginning in June 1970:

Chairman, T. H. Boone
1st Vice-Chairman, J. E. Fitzgibbons
2nd Vice-Chairman, F. M. Gavan
Secretary, B. Hammarstrom

Although the committee is new and quite small, the following accomplishments can be reported:

(1) Two definitions have been accepted and two more are being forwarded.

(2) A ballot on the Method of Test for

Flexibility for Resilient Flooring Materials with Cylindrical Mandrel Apparatus has been completed, and is being submitted to ASTM Headquarters for acceptance.

(3) A new Subcommittee, F-6.50, *USA National Committee on ISO for Resilient Floor Coverings*, was formed with F. M. Gavan as chairman.

(4) A symposium on Simulated Service and Performance Testing for Floor Coverings, was cosponsored at Atlantic City, N. J., in June 1969.

(5) The scope is being revised to include specifications.

Respectfully submitted on behalf of the committee,

T. H. BOONE,
Chairman

BRYN HAMMARSTROM,
Secretary

REPORT OF COMMITTEE F-7 ON AEROSPACE INDUSTRY METHODS

The initial approval for a new ASTM "F" committee oriented to methods for the aircraft/aerospace industry, and also for the transfer to it of 24 tentatives and standards from ASTM Committee D-2, was granted by the ASTM Board of Directors in September 1968.

The year 1968-1969 was largely taken up in organizational work—refinement of scope, clarification of title, establishment of subcommittees, etc. Based upon the approvals received during the final organizational meeting on September 2, the Board of Directors in September 1969 granted formal approval to ASTM Committee F-7 on Aerospace Industry Methods. The charter organization is comprised of the Executive Committee, Division C on Contamination, Division F on Fluids, and Division D on Propellants. The scope approved for Committee F-7 is as follows:

"The promotion of knowledge of aerospace, aircraft, and allied industry materials, test methods and techniques, and the provision of standards for use in industry through their adoption by, or development within, ASTM Committee F-7 and by recommendations to other ASTM technical committees or to other technical organizations.

Documentation, including methods of test, recommended practices, nomenclature, specifications, and related technical information developed by this committee and by others with their consent, will be coordinated, letter balloted, or otherwise promulgated.

Areas of standards development applicable to this scope, but under the jurisdiction of other ASTM committees or other organizations are excluded from development by this committee unless those other technical bodies do not choose to act directly on the development of specific standards needed by the aerospace, aircraft, and allied industries. In such cases, Committee F-7 may elect to develop, letter ballot, coordinate, and promulgate the needed standards."

Although organizational work continues to date, the year 1969-1970 has been a period of considerable accomplishment. Committee F-7 has moved with dispatch to conserve and advance the standard items assigned to it, to complete several new methods, and to initiate review of approaches to several additional problem areas identified to it by the aircraft/aerospace industry.

In June 1969 the first committee meeting, including Divisions C, F, and P, was held during the ASTM Annual Meeting at Atlantic City, N. J. The second meeting of Committee F-7 was held in Toronto, Ontario, during the June 1970 ASTM Annual Meeting. The F-7 Executive Committee met at the Aerospace Corporation, El Segundo, Calif. on Jan. 7, 1970, and at the Santa Barbara Inn, Santa Barbara, Calif. on April 21, 1970. Division C on Contamination held technical meetings in Houston, Tex. on Dec. 8, 1969, and in Santa Barbara, Calif. on March 24, 1970. Division P on Propellants met in Houston, Tex. on Dec. 9, 1969.

At the end of the current period, the membership of Committee F-7 consisted of 60 voting members with the following classifications of voting interest: producers—22, consumers—26, and general interests—12.

An award was presented by Committee F-7 to J. C. Botkin, Lockheed Aircraft Co., Burbank, Calif., in recognition of his special contribution to the committee. His sensitivity to the needs of the aircraft/aerospace industry for highly specific ASTM test methods and his outstanding effort and personal sacrifice over many years were instrumental in building the interest and the organization which has become ASTM Committee F-7 on Aerospace Industry Methods.

The charter officers of the Committee F-7 are:

Chairman, J. D. McClelland

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Vice-Chairman, D. R. Walker
Secretary, F. P. Brennan

A nominating committee has been appointed and is preparing a slate of officers and Executive Committee members at large for 1970 to 72 for submission to letter ballot approval by the committee in 1970.

The Executive Committee is comprised of the officers, chairmen of the subcommittees, and members at large. In addition to the above officers the Executive Committee is comprised of L. T. Bouchez, L. D. Carver, E. F. Casey, J. Dickason, N. A. Gould, D. A. Marlow, M. C. Miyaji, V. N. Saffire, R. S. Shane, and R. Wentz.

RECOMMENDATIONS ACCEPTED BY THE COMMITTEE ON STANDARDS

Subsequent to the 1969 annual report, Committee F-7 presented to the Society through the Committee on Standards the following recommendation which was accepted on July 10, 1970:

New Tentative:

F 321 - 70 T, Method for Automatic Particle Counter Size Setting (Division C)

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Committee F-7 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which were accepted by the society effective on Aug. 14, 1970.

Adoption of Tentative as Standard Without Revision:

F 302 - 70 (formerly D 2388 - 65 T), Field Sampling of Aerospace Fluids in Containers (Division C)

D 2389 - 70 (formerly D 2389 - 65 T), Test for Minimum Pressure for Vapor Phase Ignition of Monopropellants (Division P)

F 303 - 70 (formerly D 2429 - 65 T), Sampling Aerospace Fluids from Components (Division C)

F 314 - 70 (formerly D 2430 - 65 T), Identification of Metallic and Fibrous Contaminants in Aerospace Fluids (Division C)

D 2506 - 70 (formerly D 2506 - 66 T), Defi-

nitions of Terms and Symbols Relating to Solid Rocket Propulsion (Division P)

D 2507 - 70 (formerly D 2507 - 66 T), Definitions of Terms Relating to Rheological Properties of Gelled Rocket Propellants (Division P)

F 304 - 70 (formerly D 2535 - 66 T), Sampling for Particulates from Aerospace Components with Convulutes (Division C)

F 306 - 70 (formerly D 2537 - 66 T), Sampling Particulates from Man-Accessible Storage Vessels for Aerospace Fluids by Vacuum Entrapment Technique (General Method) (Division C)

D 2539 - 70 (formerly D 2539 - 66 T), Test for Shock Sensitivity of Liquid Monopropellants by the Card Gap Test (Division P)

D 2540 - 70 (formerly D 2540 - 66 T), Test for Drop Weight Sensitivity of Liquid Monopropellants (Division P)

D 2541 - 70 (formerly D 2541 - 66 T), Test for Critical Diameter and Detonation Velocity of Liquid Monopropellants (Division P)

F 309 - 70 (formerly D 2542 - 66 T), Sampling of Noncryogenic Aerospace Propellants (Division C)

F 310 - 70 (formerly D 2543 - 66 T), Sampling Cryogenic Aerospace Fluids (Division C)

F 307 - 70 (formerly D 2544 - 66 T), Pressurant Gas Sampling for Gaseous Analysis (Division C)

F 308 - 70 (formerly D 2545 - 66 T), Sampling for Particulates from Aerospace Components or Systems (Glass Blow-down Method) (Division C)

F 315 - 70 (formerly D 2546 - 66 T), Test for Identification of Solder and Solder Contaminants in Aerospace Fluids (Division C)

Adoption of Tentative as Standard with Revision:

F 313 - 70 (formerly D 2387 - 65 T), Test for Insoluble Contamination of Hydraulic Fluids by Gravimetric Analysis (Division C)

F 305 - 70 (formerly D 2536 - 66 T), Sampling Particulates from Reservoir-Type Pressure-Sensing Instruments by Fluid Flushing (Division C)

REPORT OF COMMITTEE F-7

These two standards were revised to bring them into line with current practice and terminology.

Revision of Standards:

F 311 - 70 (formerly D 2391 - 69), Test for Processing Aerospace Liquid Samples for Particulate Contamination Analysis Using Membrane Filters (Division C)

F 316 - 70 (formerly D 2499 - 69), Test for Pore Size Characteristics of Membrane Filters for Use with Aerospace Filters (Division C)

These two standards were revised to bring them into line with current practice and terminology.

The appendix of Method F 316 was revised by the rewriting of the second, third, fourth, fifth, and sixth equations for pore size formula derivation.

D 2512 - 70 (formerly D 2512 - 69), Test for Compatibility of Materials with Liquid Oxygen (Impact Sensitivity Threshold Technique)

This method has been revised by the addition of Appendix II on Impact Testing in High Energy Propellants. This extensive addition covers the threshold procedure for impact testing in high energy propellants. It differs from the parent method only in the additional safeguards and restraints required when handling these dangerous materials, both for safety and for prevention of interfering reactions.

The following proposed new tentatives received negative votes on F-7 Ballot 70-1 and will be resolved at the June 1970 meeting in Toronto.

Automatic Particle Counter Sizing Accuracy Method

Nonvolatile Residue of Halogenated Solvent Extract from Aerospace Components (Using Rotary Flash Evaporator)

In addition, the former D 2437 - 68 T and D 2767 - 68 T were transferred to Committee F-7 and redesignated F 301 - 68 T and F 317 - 68 T, respectively.

ACTIVITIES OF SUBCOMMITTEES

Division C on Contamination (D. A. Marlow, chairman)—The work of Division C resulted in fourteen tentative methods be-

ing recommended to the Committee on Standards for elevation to standard status. The two proposed tentatives, each receiving single negatives in F-7, Ballot 70-1, were scheduled for discussion and resolution during the June 1970 Toronto meetings.

D 2508 - 66 T has been given a one-year extension as a Tentative by the Committee on Standards and will be given priority attention by Division C. Extensive revision is necessary before the tentative is submitted to ballot for the 1971 edition.

Progress has been made in several contamination research areas, particularly toward producing particulate of precise size for calibration and control as well as development of a series of related methods to complement the automatic monitor tentative and current manual count methods.

Contact with contamination control personnel of other nations has been established through such organizations as the Institute of Petroleum. Through this cooperative liaison it is expected that the standardization principle can be spread over the widest usage possible.

A common glossary of terminology related to contamination is being prepared and will be coordinated with other ASTM technical committees. E. F. Casey is chairman of this special subcommittee. Development of a data bank as a detailed source of contamination information is also under consideration by this group. Division C continues to devote attention toward determining a method for automatic filtering of gelled fuel. Contact has been established with the U. S. Army in an effort to determine progress by the military on this problem.

Liaison has been established with the following organizations: SAE—Society of Automotive Engineers, A6 Panel; AIAA—American Institute of Aeronautics & Astronautics; and IP—Institute of Petroleum, Committee B.

The organization of Division C is as follows:

Section I, Coordination & Communication—E. F. Casey, chairman; Section II, Sampling—L. D. Carver, chairman; Section III, Processing—J. Hadel, chairman; Section IV, Sample Analysis—H. Weltman, chairman; Section V, Automatic Monitors—D. A. Marlow, chairman; Section VI, Con-

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trolled Areas—K. Mason, chairman; Section VII, Filters & Materials—D. R. Walker, chairman.

Division F on Fluids (Dr. J. R. Sterniski, chairman)—The major activity of Division F presently focuses on investigation of thermal diffusion as a method of determining molecular weight distribution of gyro fluids. A round-robin testing program has produced valuable information concerning possible areas of preliminary procedure improvement. In addition gel permeation chromatography is being considered for the same purpose and a standard procedure for this technique is also contemplated. Since molecular weight distributions are particularly troublesome to floated gyro researchers, these studies will continue to receive strong attention to develop procedures which can be submitted for tentative status.

Two proposed methods which received negatives on earlier ballots are being revised for rebaloting. These are Test for Density and Specific Gravity of Viscous Materials by Gay-Lussac Pycnometer and Test for Density and Specific Gravity of Viscous Materials by Babcock Pycnometer.

Division P on Propellants (M. C. Miyaji,

chairman)—Six tentative methods produced by Division P have been recommended to the Committee on Standards for adoption as standards. Method D 2512, Compatibility of Materials with Liquid Oxygen (Impact Sensitivity Threshold Technique), was accepted as standard during the past year. Its Appendix II, "Impact Sensitivity in High Energy Propellants," is currently before the Committee on Standards. This standard represents a compromise method covering Air Force Bulletin 527 and Marshall Space Flight Center 106. Previously the differences between the latter two methods caused concern within industry and government laboratories. Two methods are expected to be ready for ballot as tentatives by mid-1970. These are: Proposed Method of Static Immersion Testing of Unstressed Materials in N_2O (NTO) and Compatibility of Materials with Liquid Oxygen (Reaction Intensity Method).

Respectfully submitted on behalf of the committee,

J. D. McCLELLAND,
Chairman

F. P. BRENNAN,
Secretary

REPORT OF COMMITTEE

F-8 ON PROTECTIVE EQUIPMENT FOR SPORTS

Committee F-8 on Protective Equipment for Sports was first organized in 1969. A conference on football injuries was held on Nov. 18 and 19, 1968, at ASTM Headquarters in Philadelphia, Pa. It was pointed out that there were many surveys being made of football injuries at various places but nobody was putting them together. It was also pointed out that athletes and coaches are heavily dependent upon the equipment manufacturers to maintain quality and improve safety. Although the manufacturers do the best job they can, they have only the unorganized feed-back from the coaches and players to help them; there is nothing substantial in the way of information gathering or standardization. Therefore it was decided that ASTM should undertake this job. Consequently, a steering committee was established to organize a full committee. This steering committee held a meeting on April 8, 1969, at ASTM Headquarters. The committee title, scope, area of interest, tentative officers, and subcommittees were established.

The organizational meeting was held on June 16, 1969, at ASTM Headquarters.

The first main meeting of Committee F-8 was held on Sept. 14 to 16, 1969, at ASTM Headquarters.

By the end of 1969 there were approximately 90 members in Committee F-8. There were 36 representatives of 25 producers, 15 representatives of consumers, and 37 general interest.

The scope of the committee, as approved by the ASTM Board of Directors is as follows:

Standardization of specifications, test methods, and recommended practices for protective equipment for sports and related materials for the purpose of minimizing injury. Promotion of knowledge as it relates to protective equipment standards. Coordination of this work with other ASTM technical committees and other organizations in this area.

Area of Interest—The objective of the committee shall be the establishment of standards for protective equipment and related materials with an initial emphasis on football.

NOTE—The committee will not write game rules but may advise governing sports organizations where rule changes could be made to minimize injury.

Bylaws were also established and approved for the committee.

The following officers were elected:

Chairman, Dr. Creighton J. Hale, Little League Baseball

First Vice-Chairman, Professor L. M. Patrick, Wayne State University

Second Vice-Chairman, Fred A. Rappleyea, Riddell, Inc.

Secretary, Karl E. Balliet, Rubatex, Inc.

Membership Secretary, Dr. C. A. Morehouse, Pennsylvania State University

The following subcommittees were formed:

F-8.01 Executive (consisting of all officers plus subcommittee chairman)

Ad hoc committee on bylaws (temporary), chairman, K. E. Balliet

Nominating committee (temporary) chairman, C. R. Kovacic

F-8.04 Definitions (not yet organized)

F-8.05 Editorial (not yet organized)

F-8.06 Statistics (data collection and interpretation) Dr. Ewen M. Clark, chairman

F-8.07 Game Rules (coordination) A. F. Visco, chairman

F-8.10 Playing Surfaces, Paul Gann, chairman

F-8.11 Body and Extremities, C. R. Kovacic, chairman

F-8.13 Head and Neck, Marshall Irving, chairman

ACTIVITIES OF SUBCOMMITTEES

Subcommittee F-8.06 on Statistics (E. M. Clark, chairman) established its scope as follows:

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Scope:

1. To survey and evaluate available data on sports injuries.
2. To establish standard guidelines for future data collection.
3. To assist the F-8 subcommittees in their work.

The following list of projects was formulated in an effort to outline a plan of approach by the subcommittee:

Suggested Projects:

1. Collect forms and nomenclature utilized in previous studies of athletic injuries.
2. Compile a list of organizations and individuals who are and have been actively involved in this area.
3. Collect data and summaries of results from previous studies and surveys.
4. Categorize collected data.
5. Disseminate information to appropriate subcommittee chairmen.

Subcommittee F-8.07 on Game Rules (A. F. Visco, chairman) established the following scope and projects:

Scope—Collect, evaluate sports playing rules for the purpose of determining whether the equipment provisions of the rules are adequate to minimize injury.

Suggested Projects:

1. Collect copies of rules.
2. List sections in rule book dealing with equipment.
3. Practice equipment that is not covered by rules (dummies).
 - (a) Suppliers and manufacturers
4. Conditioning practices.
5. Conference restrictions.

Subcommittee F-8.10 on Playing Surfaces (Paul Gann, chairman) established its scope as follows:

Scope:

1. To consider all playing surfaces (synthetic and natural), including turf, basketball courts, running tracks, padding, hockey rink and boards, baseball fences, etc.
2. To establish which surface parameters are most related to player injury in player surface contact.
3. To establish means to measure the parameters of a playing surface as it relates

to the safety of the player and his ability to perform.

4. The playing surface is understood to mean not only the actual contacting surface, but also the subsurface to the extent that it affects player safety.

As an effective means to study playing surfaces and to concentrate on the most important parameters first, the committee agreed to divide the playing surfaces into three categories, namely:

- I. Turf-like surfaces—football, baseball, lacrosse, soccer, rugby, etc.
- II. Non-turf like surfaces—basketball, tracks and field events, fieldhouses, etc.
- III. Special surfaces—ice, matting (wrestling, goal posts, etc.), children's recreation and playground areas, ice rink boards, baseball fences, etc.

In order to accomplish this work more effectively, task groups were set up as follows:

Task Group 1 on Background on Injuries

Task Group 2 on Shock Absorption

Task Group 3 on Footing and Abrasiveness

Subcommittee F-8.11 on Body and Extremities (C. R. Kovacic, chairman) decided the following subjects should be covered:

1. Definition of environment to:
 - (a) Establish the environmental parameters and
 - (b) Establish the force levels and the nature of force inputs.
2. Determination of human tolerances to:
 - (a) Determine the severity, type, and frequency of injuries and
 - (b) Determine the mechanism of injuries.
3. Development of test methods and procedures to:
 - (a) Establish test methods for the definitions of equipment performance and
 - (b) Establish the minimum performance specifications including fit, size, etc.

To accomplish these objectives the following task groups were established:

Task Group 1 on Definition of Environment

Task Group 2 on Determination of Human Tolerances

Task Group 3 on Development of Test Methods and Procedures

REPORT OF COMMITTEE F-8

Subcommittee F-8.13 on Head and Neck (Marshall Irving, chairman) established the following scope:

Scope—The objectives of the subcommittee on head and neck shall in general cover all facets of head and neck protection, and in particular, will include:

1. *Definition of the environment* in specific quantitative terms.

2. *Establishment of human tolerance* to the environment.

3. *Development of a test specification* to evaluate performance of the head and neck protective equipment.

Task groups were established as follows:

Task Group 1 on Definition of Environment

Task Group 2 on Establishment of Human Tolerance

Task Group 3 on Establishment of a Test Method

A proposed standard for protective headgear for football was considered but not adopted. It was the consensus of the subcommittee that a football helmet test method should be written first, based on present methods and knowledge. Work is in progress on this.

Respectfully submitted on behalf of the committee,

C. J. HALE,
Chairman

K. E. BALLIET,
Secretary

REPORT OF COMMITTEE

G-1 ON CORROSION OF METALS

Committee G-1 on Corrosion of Metals and its subcommittees held two meetings during the year: on June 23 to 27, 1969, in Atlantic City, N. J., and Dec. 2 to 5, 1969, at Pittsburgh, Pa.

The committee consisted of 293 voting members on Dec. 2, 1969. This is an increase of 5 members since the last annual report.

Organizational changes since the last report include: addition of a Vice-Chairman for Membership Development and Liaison (V. P. Pearson) and a Meetings Secretary (P. W. Jeffery) to the list of committee officers, and establishment of an editorial review subcommittee (G01.91), chaired by E. H. Baker, under the Executive Committee.

Committee G-1 sponsored two symposia during 1969: on "Galvanic Corrosion" during the 1969 summer meeting and on "Corrosion Testing—Science or Fiction," jointly with ASM at the Materials Engineering Congress Oct. 14, 1969. In addition a booklet on "Facts For Committee G-1 Members," for distribution to committee members to explain how the committee is organized and the procedures by which it functions, has been drafted under the guidance of G. W. Klohr.

Newly elected officers to serve during the 1970-2 period are:

Chairman, W. H. Ailor

Vice-Chairman (Organization), G. W. Klohr

Vice-Chairman (Program), H. H. Lawson

Vice-Chairman (Membership Development and Liaison), V. P. Pearson

General Secretary, W. D. France, Jr.

Meetings Secretary, P. W. Jeffery

Membership Secretary, H. W. Dubach

Members-at-Large of Executive Committee: F. L. LaQue, F. M. Reinhart, L. C. Rowe, and D. H. Thompson

The cash balance of funds held by the Society for the committee amounted to \$2,989.20 as of Dec. 31, 1969. This is an increase of \$115.76 over the last report due to interest received.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee G01.01 on Research (P. J. Sereda, chairman) has asked the Executive Committee to clarify what its activities should encompass.

Subcommittee G01.02 on Nomenclature (J. Kruger, chairman) carried out a balloting on definitions of corrosion terms, revised those terms to which objections were made, and has carried out a final balloting on 19 definitions. It has also proposed new corrosion rate units that conform to the SI system to be balloted.

Subcommittee G01.03 on Statistical Analysis and Planning of Corrosion Testing (A. A. Staklis, chairman) had prepared a Recommended Practice on Methods of Applying Statistics to Corrosion Problems. The subcommittee is preparing a symposium on Use of Computers and Analytical Methods in Evaluating Corrosion Data for the 1971 Annual Meeting.

Subcommittee G01.04 on Atmospheric Corrosion (S. K. Coburn, chairman):

Section G01.04.01 on Weather (H. Guttman, chairman) exposed a second series of test panels to measure the corrosion of steel and zinc as a function of weather factors and atmospheric pollutants in Chicago and New York. First year removals were made at Chicago. Data on various pollutants in six cities for 1962-1965 have been received from the National Air Pollution Control Administration from its Continuous Air Monitoring Projects (CAMP).

Section G01.04.02 on Metallic Coatings on Steel (V. P. Pearson, chairman) will make

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an exposure of galvanized (comparison of commercial coating processes), aluminized (effect of silicon-bearing versus pure aluminum), and chromized steel in various atmospheres this year.

Section G01.04.03 on Ferrous Metals (H. H. Lawson, chairman) has prepared a "Recommended Practice for Conducting Atmospheric Corrosion Tests" which will be submitted to letter ballot of the committee. The proposed exposure test of commercial high-strength, low-alloy steels to characterize their range of performance is being dropped after consultations with Committee A-1. They feel that the information from such a test is not needed at this time.

Section G01.04.04 on Nonferrous Metals (J. L. Brandt, chairman) has decided to initiate a new atmospheric test program on the corrosion behavior of aluminum and other nonferrous metals with selected surface treatments.

Subcommittee G01.05 on Laboratory Corrosion Testing (W. D. France, Jr., chairman) is presently functioning with three sections and eight active task groups. Five additional task groups are in the initial stages of being activated.

Section G01.05.01 on General Corrosion Tests and Specimens (J. D. Palmer, chairman):

Task Group 1 on Preparation, Cleaning, and Evaluation of Corrosion Test Specimens (D. H. Thompson, chairman) has distributed a questionnaire to the G-1 membership to solicit any suggestions for the revision of the Recommended Practice G 1-67, Preparing, Cleaning, and Evaluating Corrosion Test Specimens, which will be undertaken during 1970.

Task Group 2 on General Test Methods for Conducting Laboratory Corrosion Tests (C. P. Dillon, chairman) has completed the original draft of a Recommended Practice for Conducting Laboratory Corrosion Tests, and the manuscript has been distributed to the entire subcommittee for comments, suggestions, and corrections.

Task Group 3 on Identification of Corrosion Products is inactive.

Task Group 4 on Electrical Resistance Corrosion Tests (J. M. Stammen, chairman) has determined, from a questionnaire to the membership, those areas of interest for fu-

ture work. Efforts are being undertaken to interest G01.12 on in-plant tests and NACE T-5A-7a in a cooperative program.

Section G01.05.02 on Localized Corrosion Tests (M. Henthorne, chairman):

Task Group 1 on Intergranular Corrosion of Nickel-Rich, Chromium-Bearing Alloys (M. A. Streicher, chairman) has completed the second draft of a Proposed Standard Method of Test for Detecting Susceptibility to Intergranular Attack in Wrought Nickel-Rich Chromium-Bearing Alloys, and the third draft will be balloted within the subcommittee early in 1970.

Task Group 2 on Intergranular Corrosion of Aluminum Alloys (S. J. Ketcham, chairman) voted on Dec. 3, 1969, to disband this group so that more attention could be given to exfoliation testing (see Task Group 8 below). This action was accepted by the subcommittee, and the Aluminum Association has been made aware of this change.

Task Group 3 on Pitting Corrosion Tests is inactive.

Task Group 4 on Dealloying Corrosion Tests is inactive.

Task Group 5 on Tests for Evaluating Crevice Corrosion is inactive.

Task Group 6 on Intergranular Corrosion in Ni-Mo Alloys (R. W. Kirchner, chairman) is now testing a commercial Ni-Mo alloy in several laboratories in an attempt to develop a satisfactory test for detecting intergranular corrosion due to welding, improper processing, etc.

Task Group 7 on Corrosion Testing of Weldments is inactive.

Task Group 8 on Exfoliation Corrosion in Aluminum Alloys (D. O. Sprowls, chairman) was activated at the December 1969 meeting and is initiating a round-robin test program to compare exfoliation tests for aluminum alloys.

Section G01.05.03 on Corrosion Tests for Metals with Protective Coatings (S. W. Dean, chairman):

Task Group 1 on the Salt Spray Test (S. J. Ketcham, chairman) has begun to examine Recommended Practice B 117, Salt Spray (Fog) Testing, for the purpose of making appropriate revisions where necessary, in accordance with ASTM policy of periodic reviews. The task group agreed to recommend that Committee G-1 approve B 117 as

REPORT OF COMMITTEE G-1

it stands in the 1970 ballot with the notation that a task group is working on this standard practice. ASTM Committees D-1, A-10, and B-8 will be contacted for assistance.

Task Group 2 on Evaluation of Anodized Aluminum (S. W. Dean, chairman) has had few suggestions for a suitable project and will circulate a questionnaire to the entire subcommittee to solicit suggestions.

Subcommittee G01.06 on Stress Corrosion Cracking and Corrosion Fatigue (H. Lee Craig, Jr., chairman) continues to provide a forum for the exchange of information concerning the problem of stress corrosion and the design of tests used to detect the susceptibility of materials to cracking and premature failure by this phenomenon.

The chairman presented a paper, "Testing for Stress Corrosion—the Elusive Phenomenon," at the ASM Metals Congress in October 1969. A committee member, F. E. Loftin, presented a paper coauthored with the subcommittee chairman at the N.A.C.E. Annual Conference on "Preventing Stress Corrosion Failures in Susceptible Aluminum Alloys" during a symposium entitled "Use of Stress Corrosion Cracking Data in Design." Several other subcommittee members participated in the program, which was organized by D. O. Sprowls, chairman of Section 01 of Subcommittee 06.

Subcommittee 06 is also providing speakers for the ASM Educational Conference on Stress Corrosion Cracking, which is being given in: Los Angeles, April 21-23, 1970; New Orleans, June 2-4, 1970; and Philadelphia, August 4-6, 1970.

A chapter in the *Corrosion Monograph* series, entitled, "Stress Corrosion Testing," will be derived from a presentation on that subject by the subcommittee chairman and section chairmen at the 1970 Symposium on the State of the Art in Corrosion Testing, held at Toronto, Canada, June 1970.

Section G01.06.01 on Test Specimens and Loading Equipment (D. O. Sprowls, chairman) is balloting a recommended practice on the C-ring stress corrosion specimen. Second drafts are under study in the respective Task Groups on: U-Bends (M. E. Henthorne, chairman), Bent Beams (A. W. Loginow, chairman), and Direct Tension (E. G. Haney, chairman). New task groups on residual

stress and preformed specimens are under consideration.

Section G01.06.02 on Environments and Materials (D. S. Neill, chairman) has recommended practices ready for balloting on the boiling magnesium chloride and the polythionic acid tests for stainless steels. The first draft of a procedure for conducting the alternate immersion test for aluminum alloys is under review. A round robin using this procedure, in a simple form, with 7039 aluminum alloy showed lack of reproducibility among laboratories. A report on this program is in preparation (T. J. Summerson, chairman). Task Group 13 on Magnesium Alloys (A. Gallaccio, chairman) was discharged after acceptance of its state of the art report on "Stress Corrosion Testing Magnesium and Magnesium Alloys—Environments and Methods." A new task group is being formed to take this report and prepare a recommended practice. Task Groups on Titanium-Based Alloys (B. Lisagor, chairman) and Copper-Based Alloys (D. H. Thompson, chairman) are developing information leading to a recommended practice for their respective alloy systems through the circulation of questionnaires and planning of round robin test programs.

Two new Task Groups were formed: one, on Atmospheric Stress Corrosion Testing, will cooperate with Subcommittee 04, Atmospheric Corrosion, and the other, Organic Test Media (E. G. Haney, chairman) will investigate the need for a test procedure in these materials.

Section G01.06.03 on Corrosion Fatigue remained inactive. Holding a symposium on this subject was suggested as a means for determining the interest in this subject.

Section G01.06.04 on Precracked Specimens (D. E. Piper, chairman) has prepared a recommended practice for the double cantilever beam specimen for testing aluminum alloys. Two other practices, one each for high-strength steels and titanium alloys, have been drafted and circulated among the section members. Close cooperation with Subcommittee E24.04 on the Influence of Environment on Subcritical Crack Growth (R. Wei, chairman) is planned.

Subcommittee G01.07 on Galvanic Corrosion (A. Gallaccio, chairman)—The June 1969 meeting in Atlantic City, N. J., and

REPORT OF COMMITTEE G-1

the December 1969 meeting in Pittsburgh, Pa., were sparsely attended. Because only two members attended the meeting in Pittsburgh, the chairman chose to determine the current status of committee activities by way of personal communications with responsible members, after that meeting. Information from these communications is reported instead of the usual record of business attainable at meetings with quorum attendance.

Task Group I on Survey of Literature on Galvanic Corrosion (A. Gallaccio, chairman)—As reported previously, a bibliography has been prepared consisting of short abstracts of available information on galvanic corrosion investigations from the open literature and other sources, since about 1930. This report is being revised, prior to submitting it to the subcommittee for review and a decision regarding further dissemination.

Task Group II on Test Programs (G. Lohsl, chairman):

(1) **Soil Burial Tests—Electrical Cable Materials** (G. Lohsl, chairman)—A progress report was submitted in which test results are given of 6 pair-19 gage direct burial telephone cable, with different shielding-grounding materials, after 13 months in soils at six different test sites. The test specimens included shielding consisting of single metals, metallurgically bonded metals, and plated metals, but do not include Al-Cu-Al bonded specimens as previously noted. Soil burial tests will be continued for at least another year.

The various metals and metal combinations are being evaluated as possible substitute shielding-grounding materials for copper, for conservation of copper.

(2) **Atmospheric Exposure—Clad Cu-Al-Cu** (P. Sexton, chairman)—Results of 1½ years' exposure under various environmental conditions were reported earlier. The tests are continuing.

As in (1) above, the conservation of copper for wider and more general applications is of interest here.

(3) **Salt Water Immersion Tests** (J. Rynewicz, chairman)—Mr. Rynewicz recently was appointed by the chairman of G01.07 to head this section, following the resignation from that duty by T. J. Lennox. In this responsibility, Mr. Rynewicz is transferred

from Subcommittee G01.09, Section V. A proposed test program will be prepared by Mr. Rynewicz and will be discussed at the next meeting. There is a specific interest in the behavior of combinations of dissimilar metals for various seacraft and submersible vehicles.

(4) **Panama Canal Zone Exposure Tests—Structural Metals and Fasteners** (A. Gallaccio, chairman)—This effort has been modified with regard to the design of structural metal coupled specimens for immersion in sea water, soil burial, and atmospheric exposure. The preparation of specimens is not completed.

(5) **Electrochemical and Exposure Tests—Aluminum and Magnesium in Contact with Molybdenum Sulfide** (C. Sonnino, chairman)—The exposure test data are not completed. A status report will be given at the next meeting.

Task Group III on Electrical Measuring Devices and Methods (C. Sonnino, chairman)—A written report on this task will be made available soon.

Considerations have been given to standardizing a design (or designs) of coupled dissimilar metal test specimens that would be applicable to all environments, that is, immersion in solutions, burial in soils, and exposure in atmospheres. It is recommended that the views on this matter prevailing among the committee members be evaluated in the light of present knowledge and experiences, and that a proposal be offered for a standard design. The proposal should include cooperative test work and appropriate test methods so that any selection of a standard specimen will be supported by consistency of the test method employed as well as results.

A paper treating galvanic corrosion testing has been prepared for the Symposium on the "State of the Art of Corrosion Testing" to be held at the Annual Meeting in Toronto, Canada, June 1970. The paper includes a review of principal factors and considerations, descriptions of laboratory and field testing methods, specimen designs, the various metal couples studied, and discussion of test results.

Subcommittee G01.08 on Corrosion of Nuclear Materials (R. J. Enrico, chairman):
Section G01.08.01 on Zirconium in Water

REPORT OF COMMITTEE G-1

Systems (S. Kass, chairman)—Round-robin tests on Zr-2.5Nb alloy are being reviewed for later publication. In a survey of the membership 8 laboratories indicated interest in a round-robin test on hydrogen pickup during corrosion. The question of revising ASTM Method G 2 to include other Zr alloys such as Ozennite and Valloy was tabled for the time being in view of the effort involved. Consideration is being given to adding an assessment of film color and quality to Method G 2.

Section G01.08.02 on Liquid Metal Systems (F. A. Smith, chairman)—A standard on solubility of oxygen in sodium has been drafted and will be sent out to the subcommittee for comment. A task force has been set up to draw a set of tentative specifications for the design and operation of plugging meters.

Subcommittee G01.09 on Corrosion in Natural Waters (K. G. Compton, chairman):

Section G01.09.01 on Deep Ocean Studies (F. M. Reinhart, chairman) after reviewing the activities in this area, discussed the possibility of compiling the information on deep ocean tests in the Tongue of the Ocean and in the Pacific near Port Hueneme into one volume.

Section G01.09.03 on Velocity Effects (G. Wacker, chairman) continued its discussion of the proposed standardization of velocity tests. The chairman has collected information on the various tests used by members of ASTM and will report at the next meeting.

Section G01.09.04 on Cathodic Protection (H. Guttman, chairman) has completed the first stage of its interlaboratory tests of methods of determining aluminum, sacrificial anode efficiencies. The results are being analyzed and plans for the next phase will be announced at the Toronto meeting in 1970.

Section G01.09.05 on Galvanic Couple Effects (J. F. Rynewicz, chairman) has its test program on fasteners organized and will proceed during the summer of 1970.

The other sections did not meet.

Subcommittee G01.10 on Methods of Test in Soil Corrosion (W. J. Schwerdtfeger, chairman)—Task Group 1 is testing the application of polarization techniques to measuring the instantaneous corrosion rates of

metals when exposed to soils. In the summer of 1968, six organizations buried underground several commonly used metals in the form of weighed pipe specimens. During the 12 to 18 months following, committee personnel representing the organizations have been engaged in periodically making polarization measurements at their respective underground test sites. The specimens have now been removed from the exposure sites. The corrosion products will be removed and the specimens reweighed for metal loss attributable to corrosion. The cumulative metal losses between periods will be calculated from the polarization measurements and compared with the actual metal losses. The goal is the development of a standard procedure for evaluating corrosion on metal surfaces exposed to underground corrosion.

Task Groups 2, 3, and 4 studying measurements of soil resistivity, soil pH, and microbial corrosion, respectively, are considering the preparation of standard procedures peculiar to soils. Task Group 4 is experimenting with the development of a suitable soil probe for evaluating the effects of oxygen and anaerobic bacteria on soil corrosivity.

Subcommittee G01.11 on Electrochemical Measurements in Corrosion Testing (S. J. Ketcham, chairman)—A Recommended Practice G 5 - 69, for A Standard Reference Method for Making Potentiostatic and Potentiodynamic Anodic Polarization Measurements, was adopted by ASTM. Samples of the 430 stainless steel used in the program are available upon request from ASTM headquarters, making it possible for any interested laboratory to use the standard reference method and compare their results with the standard curve.

A survey was made among the members on instrumentation used for electrochemical testing, along with any problems encountered. Results will be submitted to the various potentiostat manufacturers for their comments.

Section G01.11.01 on Polarization (W. D. France, Jr., chairman) has two task groups. Task Group 1 is on Galvanostatic and Galvanodynamic Polarization and is chaired by H. L. Craig, Jr. This task group has initiated an interlaboratory program to determine the reproducibility of corrosion poten-

REPORT OF COMMITTEE G-1

tials as well as galvanostatic and galvanodynamic linear and logarithmic polarization curves for five metal-electrolyte systems.

Task Group 2 on Potentiostatic and Potentiodynamic Polarization has not initiated any new programs since issuance of Recommended Practice G 5 - 69, pending completion of the program of Task Group 1.

Subcommittee G01.12 on In-Plant Corrosion Tests (D. L. Graver, chairman)—Due to an apparent lack of interest on the part of the membership, the chairman recommended that the subcommittee be placed on inactive status subject to reactivation later when the need arises.

Subcommittee G01.13 on High Temperature Oxidation and Corrosion By Gases (L. R. Scharfstein, chairman)—A recent ques-

tionnaire indicated that 45 companies perform some type of test for material deterioration above 750 F. Types of test, in decreasing interest, were oxidation, carburization, sulphidation, nitridation, etc. Alloy systems for which there is interest included nickel-base alloys, stainless steels, low alloy steels, super-alloys, refractory alloys, etc. Based on these results a task group has been organized to design and conduct a round robin test on metal deterioration of 6 alloys in air at high temperatures.

Respectfully submitted on behalf of the committee,

W. H. AILOR,
Chairman

J. B. HORTON,
General Secretary

REPORT OF COMMITTEE

G-2 ON EROSION BY CAVITATION OR IMPINGEMENT

Committee G-2 on Erosion by Cavitation or Impingement held two meetings: one on June 26, 1969, during the ASTM Annual Meeting in Atlantic City and the other at the Netherland Hilton Hotel in Cincinnati on Dec. 10, 1969, during ASTM Committee Week.

The main committee consists of 59 members.

The committee sponsored a two-day symposium at the 1969 ASTM Annual Meeting in Atlantic City on Characterization and Determination of Erosion Resistance which was attended by 56 people.

At the Dec. 10, 1969, meeting of the committee in Cincinnati a proposal by the Committee on Simulated Service and Performance was presented recommending that Committee G-2 consider broadening its scope to include testing for wear of materials by other means than cavitation and impingement. An ad hoc committee was appointed with A. Lehman as chairman to study this matter and report to the May 28, 1970, meeting in Detroit.

F. C. Gilman was appointed to the office of acting secretary on Dec. 10, 1969, when it became necessary for Mr. Freche to resign from the office of secretary because of a change of assignment.

The following officers were elected on May 28, 1970, to serve for the ensuing two-year term:

Chairman, F. G. Hammitt
Vice-Chairman, F. J. Heymann
Secretary, F. C. Gilman

ACTIVITIES OF SUBCOMMITTEES

Subcommittee I on Test Procedures (F. G. Hammitt, chairman)—A shortened form of the complete report of the round robin (*STAR* Vol 7 No. 20, N69-35715) has been submitted to ASTM for publication. Specifications for a standard test procedure using the vibratory cavitation apparatus are being prepared by a task group under the chairmanship of A. Thiruvengadam. These have not yet been submitted for approval by the main committee.

The Liquid Impingement Section under the chairmanship of F. J. Heymann is conducting an investigation of liquid impingement methods to organize round-robin tests and develop standards for test facilities and procedures.

Subcommittee II on Papers (F. J. Heymann and A. Thiruvengadam, co-chairmen)—Nineteen of the twenty-three papers presented at the 1969 symposium have been approved for publication and will appear during 1970 as *STP* 474.

Subcommittee III on Nomenclature (R. Hickling, chairman)—Several successive drafts of definitions and nomenclature have been prepared but complete agreement within the subcommittee has not yet been achieved.

Respectfully submitted on behalf of the committee,

J. Z. LICHTMAN,
Chairman

F. C. GILMAN,
Acting Secretary

REPORT OF COMMITTEE

G-3 ON DETERIORATION OF NONMETALLIC MATERIALS

Committee G-3 on Deterioration of Non-metallic Materials met on Oct. 9 and 10, 1969, at ASTM Headquarters in Philadelphia, Pa. It will meet next on June 22, 1970, in Toronto, Canada, and is planning to meet in Williamsburg, Va., on Nov. 15 and 16, 1970.

The committee is nonclassified and consists of 124 members.

The following test methods have been approved by G-3 and will be submitted to the Committee on Standards: Tentative Method of Test for Disbonding Characteristics of Pipeline Coatings by Direct Soil Burial (Task Group G03.03.01.01), Tentative Method of Test for Penetration Resistance of Pipeline Coatings (Task Group G03.03.01.01), Tentative Method of Test for Joints, Fittings and Patches in Coated Pipelines (Task Group G03.03.01.01), and Tentative Method of Test for Chemical Resistance of Pipeline Coatings (Task Group G03.03.01.01). These tentatives were instituted at the request of the AGA-NACE to fill a need for test methods in this area. Four additional tentatives for pipeline coatings are also being drafted.

On Jan. 20, 1970, the ASTM Board of Directors approved the transfer of jurisdiction of the following documents from Committee D-20 on Plastics to Committee G-3: Recommended Practice D 1924 - 63, for Determining Resistance of Plastics to Fungi, and Recommended Practice D 2676 - 67 T, for Resistance of Plastics to Bacteria.

A paper by P. Ganser and F. M. Gavan entitled "The Standards Process—Effective Cooperation and Application" will be published in the September 1970 issue of *Materials Research and Standards*.

The following officers were elected in June 1970 for the ensuing two-year term:

Chairman, F. M. Gavan
First Vice-Chairman, H. W. Dubach
Second Vice-Chairman, L. Teitell
Secretary, R. P. Fellmann

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, Committee G-3 submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which became effective on April 13, 1970:

Adoption of Tentative as Standard Without Revision:

E 188 - 70 (formerly E 188 - 69 T), Recommended Practice for Operating Enclosed Carbon-Arc Type Apparatus for Light Exposure of Nonmetallic Materials (Subcommittee G03.03)

Adoption of Tentative as Standard with Revision:

E 239 - 70 (formerly E 239 - 69 T), Recommended Practice for Operating Light- and Water-Exposure Apparatus (Xenon-Arc Type) for Exposure of Nonmetallic Materials (Subcommittee G03.03)

This was revised to meet present needs.

E 240 - 70 (formerly E 240 - 69 T), Recommended Practice for Operating Water-Cooled Xenon-Arc Type Apparatus for Light Exposure of Nonmetallic Materials (Subcommittee G03.03)

This was revised to meet present needs.

Revision of Standard:

D 1924 - 70 (formerly D 1924 - 63), Recommended Practice for Determining Re-

REPORT OF COMMITTEE G-3

sistance of Synthetic Polymeric Materials to Fungi (Subcommittee G03.04)

This revision allows broader use.

ACTIVITIES OF SUBCOMMITTEES

Subcommittee G03.01 on Editorial and Definitions (L. Teitall, chairman) editorially reviewed the four pipeline coating methods prior to submission to the Society, and will review all other recommendations at the appropriate time. They are continuing their work on definitions for selected types of atmospheres and on a suitable definition for "correlation," the latter jointly with G03.03.03.

Subcommittee G03.02 on Natural Environmental Testing (J. L. Scott, chairman) includes the following sections:

Section G03.02.01—A list of solar radiation measuring devices and a list of typical equipment used in air pollution research have been compiled and submitted to G03.01 for editorial approval. These lists will be submitted to the Society for publication.

Section G03.02.02—Work is just under-way to develop a tentative recommended practice for measuring solar radiation by chemical actinometry.

Section G03.02.03—Studies to measure the total time of wetness of a sample during outdoor exposure are continuing.

Comprehensive revisions have been made in Recommended Practice G 7-69 T, for Atmospheric Environmental Exposure Testing of Nonmetallic Materials. These have passed subcommittee ballot and will soon be acted on by the main committee. A new recommended practice for measurement of incoming solar radiation has also passed subcommittee ballot and is ready for action by the main committee.

Subcommittee G03.03 on Simulated and

Controlled Environmental Tests (J. E. Clark, chairman) is composed of four sections:

G03.03.01 is concerned with developing definitions and recommended practices in the area of failure and performance criteria. The emphasis to date has been on appearance properties, with special reference to color retention on exposure.

Task Group G03.03.01.01 deals with pipeline coating evaluation. They held meetings in Philadelphia, Pa., on May 12, 1969, in Bradford, Pa., on May 11, 1970, and plan to meet in Toronto, Canada, on June 25, 1970.

G03.03.02 is continuing to work on general recommended practices which will further update and consolidate E 188, E 239, and E 240.

G03.03.03 is primarily concerned with establishing correlations between natural and artificial exposure data for nonmetallic materials. This is, obviously, a monumental task, and this work is expected to continue indefinitely. Based on available evidence examined by the members of this section, they would recommend the discontinuance of generalized claims such as "one week of exposure in Apparatus X is equivalent to one year of outdoor exposure."

G03.03.04 is concerned with definitions.

Subcommittee G03.04, Biological Deterioration (W. S. Taylor, chairman) is continuing joint committee work with Committees D-10, D-14, and D-9. This section has two task groups working on algae and one editorial group on compilation of specifications.

Respectfully submitted on behalf of the committee,

F. M. GAVAN,
Chairman

R. P. FELLMANN,
Secretary

REPORT OF ASTM-ASME-MPC JOINT COMMITTEE ON EFFECT OF TEMPERATURE ON THE PROPERTIES OF METALS

The ASTM-ASME-MPC Joint Committee on Effect of Temperature on the Properties of Metals and its subcommittee and panels met in Atlantic City during the ASTM Annual Meeting, June 23-26, 1969, and at Battelle Memorial Institute, Nov. 13-14, 1969. One of the panels, namely, the Aerospace Panel, did not meet at Battelle but met during the annual ASME Meeting in Los Angeles on Nov. 17-21, 1969.

During 1969, the Joint Committee sponsored one technical session and three informal workshops. Arrangements are being made for the sponsoring of five additional programs in the near future. These sessions, past and future, are recorded in the reports of the various panels.

George Lein resigned from the Joint Committee. H. C. Cross was appointed emeritus member of the Joint Committee.

The officers for the Joint Committee are as follows:

Chairman, J. J. Heger
Vice-Chairman, M. Semchyshen
Vice-Chairman, I. A. Rohrig
Secretary, A. M. Hall
Members-at-Large, G. V. Smith and P. M. Brister

The status of funds in the account of the Joint Committee, as of Oct. 1, 1969, is as follows:

Cash on hand, Sept. 1, 1969	\$10,488.37
Receipts, Interest	1,171.31
Balance on hand, Oct. 1, 1969	\$11,659.68

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 annual report, the Joint Committee submitted the following recommendations to the Society for action

under the Interim Procedure for Standards, which became effective on May 29, 1970:

E 21-70 (formerly E 21-69), Recommended Practice for Short-Time Elevated-Temperature Tension Tests of Materials (Test Methods Subcommittee)

The revision was to incorporate new techniques for controlling temperature and specimen bias and for calibration of apparatus; to require more comprehensive report of data on tensile and yield strengths, elongation, and reduction of area.

E 139-70 (formerly E 139-69), Recommended Practice for Conducting Creep and Time-for-Rupture Tension Tests of Materials (Test Methods Subcommittee)

The revision added definitions and incorporated changes in temperature measurement and control, refined procedures for strain measurement, and required more comprehensive reporting of data.

The revised standards will appear in the 1971 *Annual Book of ASTM Standards*, Part 31.

ACTIVITIES OF PANELS AND THE STANDING SUBCOMMITTEE

The Joint Committee sponsors activities related to the generation, accumulation, and dissemination of information concerning the temperature-dependent properties and behavior of metals, and to the standardization of test methods. The work of the Joint Committee is carried forward by a number of panels. Four of these panels—Aerospace, Chemical and Petroleum, Gas Turbine, and Steam Power—are "industry oriented." Two other panels bridge the interests of the industry-oriented panels—Applied Research and Low Temperature. The seventh group, Test Methods Subcommittee, covers test methods for evaluating metals at low and

REPORT OF ASTM-ASME-MPC JOINT COMMITTEE

high temperatures. The current activities of the panels are summarized from the reports prepared by the respective chairmen.

Aerospace Panel (J. L. Christian, chairman) sponsored a two-session symposium on Advances in High-Strength Stainless Steels at the ASM WESTEC Meeting in Los Angeles, March 10, 1969. In cooperation with the Low-Temperature Panel and ASTM Committee E-4, it will hold a symposium on Fracture-Toughness Testing at Cryogenic Temperatures at the June 1970 ASTM Meeting in Toronto, Canada. In cooperation with the Low-Temperature Panel, it will hold a workshop on Fracture Toughness and Low-Temperature Properties of Composite Materials in 1971. This panel is also planning a symposium on Effects of Gaseous Hydrogen on Metals, which will be held during the AIME Meeting in May 1970, at Las Vegas, Nev.

Applied Research Panel (M. Semchyshen, chairman) is continuing its cooperative program on the determination of long-time creep-rupture strength of Type 304 stainless steel. In this program, two specimens are still in test at 1100 F, and these tests have been in progress for about 60,000 h. One of the test specimens has entered "third-stage creep," and both tests will be continued until rupture occurs. The panel has appointed a task group to recommend future investigations that are required in this program. The panel is sponsoring two experimental programs, both of which are being financed by the Metal Properties Council. One of these programs consists of a fatigue-damage survey, the results of which will be available in early 1970 and will be published through the channels of ASTM. The second program is a long-range program pertaining to the effect of size on the notch-rupture behavior of various bolting steels. The experimental work pertaining to this program is being conducted by the Material and Process Laboratory of the Large Steam Turbine and Generator Division of the General Electric Company. This program was begun during 1968, and plans are that it will continue for about seven years. This panel appointed a task group to study the problems involved in parametric procedures for evaluating strength at elevated temperatures.

Chemical and Petroleum Panel (A. R.

Cuiffreda, chairman) sponsored an informal workshop session on Creep and Creep-Rupture Strength of Austenitic Stainless Steels during the June 1969 meeting of ASTM. This panel is also sponsoring a program, financed by the Metal Properties Council, on Evaluation of Cast, High-Strength Stainless Alloys. In cooperation with Subcommittee II of the Metal Properties Council, this panel is outlining a program to investigate the effect of hydrogen on the properties of chromium-molybdenum steels.

Gas-Turbine Panel (G. J. Wile, chairman) sponsored a workshop session on Erosion Problems in Compressors during the June meeting and from the results of this workshop session is organizing a formal symposium on the same subject. This panel also has a creep-damage task force, which is examining procedures employed by the Air Force and by commercial aircraft companies for overhauling and repairing gas-turbine engines. The panel's task force on fatigue damage is surveying the practices employed to extend operating life of fatigue-damage hardware. This task force will make a final report in June 1970, and this final report will form the basis for a technical paper. The panel is also sponsoring a round-robin testing program on the high-temperature corrosion of several gas-turbine alloys.

Low-Temperature Panel (C. F. Hickey, Jr., chairman) is sponsoring a testing program at TRW on the subject, Plain-Strain Fracture of Some Cryogenic Materials. This program is financed by the Metals Properties Council and includes the following material and thicknesses:

Aluminum—X2021-T81—1 in. thick
Aluminum—7039-T61—2½ in. thick
Titanium—6Al-4V (2 microstructures)—1 in. thick
Steel—9 Percent Nickel—3 in. thick
Steel—PH 13-8 Mo—1½ in. thick
Steel—18 Ni Maraging (200 grade)—1½ in. thick
Steel—9 Ni-4 Co—1 in. thick

This panel sponsored a workshop session on Meeting the Challenge With Cryogenic Steels at the June 1969 meeting. The panel also has arranged a program, jointly financed by MPC and DMIC, for periodically collecting, summarizing, and disseminating all

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data pertaining to the cryogenic properties of metals.

Steam Power Panel (R. H. Zong, chairman) continues to be interested in the development of short-time proof tests to make possible the more effective utilization of materials for elevated-temperature service. In cooperation with the Committee on Corrosion and Deposits of ASME, this panel is planning an informal workshop on the subject, Liquid Coal-Ash Corrosion. This panel is also planning to sponsor an informal workshop on the subject, Stress-Corrosion Experience in the Steam-Power Industry.

Test Methods Subcommittee (H. R. Voorhees, chairman) is continuing its monitoring and calibration of the stock of Type 304 stainless steel stress-rupture specimen bank material marketed through ASTM. The panel sponsored an informal workshop on the subject, Elevated-Temperature Tensile and Creep-Rupture Testing at the June 1969

meeting and, on the basis of the success of this workshop, will plan a formal symposium at the ASTM meeting in Toronto. This panel also has revised ASTM Specification E 21 pertaining to tension testing at elevated temperatures, and Specification E 139 pertaining to creep and rupture testing at elevated temperature.

In addition to these specific activities, this subcommittee continues its formulation of new recommended practices for tests of metals as affected by temperature and maintains its surveillance over existing test methods with a view of making necessary revisions in these methods to keep abreast of current technology and experience.

Respectfully submitted on behalf of the joint committee,

J. J. HEGER,
Chairman

A. M. HALL,
Secretary

REPORT OF ALCA-ASTM JOINT COMMITTEE ON LEATHER

The ALCA-ASTM Committee on Leather (joint with the American Leather Chemists Association) held two meetings during the year: on May 8 and 9, 1969, at Statler Hilton Airport Inn, Nashville, Tenn., and on Oct. 22 and 23, 1969, at Logan International Hotel, Boston, Mass.

The committee consists of 40 voting members classified as 13 producers, 8 consumers, and 19 general interest.

The Joint Committee notes with deep regret the sudden death of Orville Weber of Brown Shoe Co. who had been chairman of Subcommittee A-11 on Bonding. Effort is being made to find a replacement.

PROPOSED METHOD TO BE PUBLISHED AS INFORMATION

The following proposed method has been recommended by subordinate groups of the ALCA-ASTM Joint Committee for publication as information. It has not been approved by the American Society for Testing and Materials:

Proposed Method of Test:

A recommendation that Proposed Method for Measuring Break Pattern of Leather be published as information was submitted to the Society on May 26, 1969.

This method covers the quantitative measurement of the break pattern of shoe upper leather. The term "break" refers to the pattern of wrinkles formed on the grain surface of upper leather when it is bent to form a concave surface.

RECOMMENDATIONS ACCEPTED BY THE COMMITTEE ON STANDARDS

Subsequent to the 1969 annual report, the ALCA-ASTM Joint Committee on Leather presented to the Society through the Com-

mittee on Standards the following recommendations, which were accepted effective on the dates indicated:

New Tentatives:

D 2821 - 69 T, Measuring the Relative Stiffness of Leather by Means of a Torsional Wire Apparatus (Subcommittee A-3) (effective July 16, 1969)

This method is designed to measure the apparent torsional modulus of leather, which is related to the characteristic of stiffness when felt in a glove. The relative stiffness of leather is greatly affected by processing conditions. The procedure will be useful for development and production control, and for procurement specifications.

This new tentative appears in the 1970 *Annual Book of ASTM Standards*, Part 15.

D 2868 - 70 T, Method of Test for Nitrogen Content (Kjeldahl) and Hide Substance (Subcommittee B-1) (effective March 19, 1970)

This method is intended for the determination of the nitrogen content of all types of leather. The nitrogen content is used to calculate the hide substance (protein fiber) content of leather.

This new tentative will appear in the 1971 *Annual Book of ASTM Standards*, Part 15.

RECOMMENDATIONS ACCEPTED BY THE SOCIETY UNDER THE INTERIM PROCEDURE FOR STANDARDS

Subsequent to the 1969 report, the ALCA-ASTM Joint Committee on Leather submitted the following recommendations to the Society for action under the Interim Procedure for Standards, which became effective on the dates indicated:

REPORT OF ALCA-ASTM JOINT COMMITTEE

New Standards:

D 2875 - 70, Method of Test for Insoluble Ash of Vegetable-Tanned Leather (Subcommittee B-3) (effective July 15, 1970)

This method is intended for determining the insoluble ash in all types of vegetable-tanned leathers. A certain amount of mineral matter is bound firmly to the hide protein but does not act as a tanning agent, therefore it is essential to know the magnitude of this component in order to determine the degree of tannage of vegetable-tanned leather.

D 2876 - 70, Method of Test for Water-Soluble Matter of Vegetable-Tanned Leather (Subcommittee B-3) (effective June 12, 1970)

This method is intended for determining the water-soluble materials in all types of vegetable-tanned leathers. Water-soluble components of vegetable-tanned leather relate to the degree of tannage and can reflect the serviceability and other properties. This measurement is commonly used in specifications for procurement and production control.

Adoption of Tentative as Standard Without Revision:

D 2213 - 70 (formerly D 2213 - 63 T), Test for Compressibility of Leather (Subcommittee A-10) (effective Jan. 22, 1970)

D 2214 - 70 (formerly D 2214 - 63 T), Test for Thermal Conductivity (Subcommittee A-10) (effective March 6, 1970)

Adoption of Tentative as Standard with Revision:

D 2098 - 70 (formerly D 2098 - 62 T), Method of Test for Dynamic Water Resistance of Shoe Upper Leather by the Dow Corning Leather Tester (Subcommittee A-4) (effective April 13, 1970)

D 2099 - 70 (formerly D 2099 - 62 T), Method of Test for Dynamic Water Resistance of Shoe Upper Leather by the Maeser Water Penetration Tester (Subcommittee A-4) (effective April 13, 1970)

Both methods were inadequate for measuring quantitatively the absorption of liquid water; hence this aspect was deleted and the procedures rewritten to comply.

Revision of Standards, Immediate Adoption:

D 1813 - 70 (formerly D 1813 - 64), Method for Measuring Thickness of Leather Test Specimens (Subcommittee A-2) (effective April 13, 1970)

The description of the gage was modified to permit the use of either the metric or U.S. customary system of measurements.

The procedure was revised to permit the use of the metric system in conformance to ASTM policy to encourage the use of metric measurements.

D 1814 - 70 (formerly D 1814 - 64), Method for Measuring Thickness of Leather Units (Subcommittee A-2) (effective April 13, 1970)

The revisions clarify the scope, apparatus, and procedure in accordance with accepted industry practice.

D 1815 - 70 (formerly D 1815 - 62), Method of Test for Water Absorption (Static) of Leather (Subcommittee A-4) (effective April 13, 1970)

The note under Scope was deleted as it no longer applies.

Withdrawal of Standard:

D 1515 - 60, Method of Test for Area of Leather (Subcommittee A-2) (effective Jan. 30, 1970)

This method was withdrawn because it no longer complied with trade practice. Area of leather is now measured by means of area measuring machines, whose accuracy is verified and maintained by other procedures.

Reapproval of Standards:

D 1611 - 60 (1970), Test for Corrosion Produced by Leather in Contact with Metal (Subcommittee A-7)

D 1913 - 63 (1969), Method of Test for Resistance to Wetting of Garment-Type Leathers (Spray Test) (Subcommittee A-4)

D 2207 - 64 (1970), Test for Bursting Strength of Leather by the Ball Method (Subcommittee A-3)

D 2208 - 64 (1970), Test for Breaking

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Strength of Leather by the Grab Method (Subcommittee A-3)

D 2209 - 64 (1970), Test for Tensile Strength of Leather (Subcommittee A-3)

D 2210 - 64 (1970), Test for Grain Crack and Extension of Leather by the Mullen Test (Subcommittee A-3)

D 2211 - 64 (1970), Test for Elongation of Leather (Subcommittee A-3)

D 2212 - 64 (1970), Test for Slit Tear Resistance of Leather (Subcommittee A-3)

These new standards will appear in the *1971 Annual Book of ASTM Standards*, Part 15.

ANSI STANDARDS

The following standards have been approved during the year as American National Standards by the American National Standards Institute:

D 1610 - 69; ANSI Z109.4-1970, Standard Method of Conditioning Leather and Leather Products for Testing

D 2096 - 69; ANSI Z109.12-1970, Standard Method of Test for Colorfastness and Transfer of Color in the Washing of Leather

ACTIVITIES OF SUBCOMMITTEES

Subcommittee I on Nomenclature and Editorial (E. G. Jackson, chairman) reviewed and suggested revisions to the drafts of eight proposed methods that were returned to the originating subcommittees for consideration. The following methods were reviewed: Analysis for Soluble Non-Tannin in Vegetable-Tanned Leathers, Water Soluble Matter in Vegetable-Tanned Leather (now D 2876), Insoluble Ash in Vegetable-Tanned Leather (now D 2875), Volatile Matter in Leather, Measuring Break (Proposed), Nitrogen Content (Kjeldahl) (now D 2868), Crock Resistance, and Measuring the Relative Stiffness of Leather by Means of a Torsional Wire Apparatus (now D 2821).

Since the Precision and Accuracy sections of proposed methods are sometimes based on weak or inadequate data, a general session on planning round-robin experiments should be held for the subcommittee chairmen and other interested members. Headquarters provided copies of Recommended Practice for Interlaboratory Testing

for each of Paper and Paper Products (D 1749), Textile Materials (D 990), and Rubber and Rubber-like Materials (D 1421). It may be that a similar pamphlet would be useful to the Joint Committee on Leather.

Some help may be available from Committee E-11 on Statistical Methods. Before asking for such assistance, however, it was agreed to review the above practices to see if a similar aid for this committee could be written, taking into account the variabilities and unique properties of leather.

Copies of the practices were taken by V. Mattei (Rohm and Haas), R. Hauck (Griess-Pfeger), W. Roddy (U. of Cincinnati), A. Carlson (DuPont), and G. Somer (L. H. Lincoln). They plan to review them and consider providing a draft, or an outline of a draft, for such a leather practice. Consultation with Committee E-11 will be sought for the final preparation. In the meantime, subcommittees planning round-robin tests may find Recommended Practice E 177, Use of the Terms Precision and Accuracy as Applied to Measurement of a Property of a Material, useful.

This subcommittee produced and is responsible for updating Definitions D 1517, Terms Related to Leather. At the time it was issued, there were a number of terms which were not included for one reason or another, such as lack of agreement on a generally accepted definition. A long list of such terms is already on hand; however, it is requested that anyone knowing of a term which is needed should send in the definition. Dr. Seligsberger agreed to seek out government procurement terms which may need definition.

Specific suggestions included: burnish, temper, hand, firm, soft, and orange peel. It was agreed that certain subjective terms like "temper" might be issued by describing them as closely as possible with admission that there were indefinable features associated with them.

At the fall meeting Dr. John Mandel, statistical consultant at the Bureau of Standards and co-author of the *ASTM Manual for Conducting an Interlaboratory Study of a Test Method*, was invited to present a seminar on planning round-robin tests of proposed methods. About 30 com-

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mittee members heard Dr. Mandel emphasize the importance of several seemingly obvious steps in the progression of a test program. He pointed out that lack of observance of these steps often results in wasted effort. Such steps include having a clearly detailed method write-up, running a few preliminary tests in several labs to show up "bugs," using an adequate number of materials (8) and laboratories (at least 6) in the full test to ensure that statistical conclusions are valid, using competent personnel, and randomizing all parameters such as choice of samples and order of testing. Given this kind of performance, he showed how various techniques for handling the data can reveal considerable information about the test and the participating laboratories. This presentation should be helpful in future planning!

Subcommittee II on Sampling and Conditioning (N. L. Paglione, chairman) did not meet.

A. General Physical Testing Group

Subcommittee A-2 on Physical Dimension: (L. Seligsberger, chairman) completed interlaboratory tests required to arrive at precision and accuracy statements for Method D 1516 for testing linear dimensions of quadrilateral leather specimens of glove and sole leather. Professor W. Roddy agreed to undertake the necessary statistical evaluation.

Consideration is being given to a revision of Method D 2347, Measuring Area of Leather Test Specimens, to permit the use of calipers for the measurement of stiff circular specimens.

The interlaboratory test of a method for the determination of apparent and true density of leather showed that the method suffers from certain inadequacies which affected the test procedure for soft glove or chamois type leather.

Methods D 1813, for Measuring Thickness of Leather Test and D 1814, for Measuring Thickness of Leather Units, were revised and approved by letter ballot of the committee. The use of fractional degrees in stating the temperature in Fahrenheit range of the conditioned atmosphere met objections by one member. This use, however, has been accepted as necessary to reflect the

conversion from the Celsius scale correctly. No work is being conducted to determine temperature ranges for individual test methods although some may be less sensitive to temperature changes than others. Instead, because of the large burden of work connected with finding the limits for each test method that would affect the results, a single temperature range of $\pm 1^\circ\text{C}$ or $\pm 1.8^\circ\text{F}$ is cited every time.

Subcommittee A-3 on Tensile Properties (R. L. Young, chairman) completed the development of a method for measuring the stiffness of glove leathers, which method was accepted as tentative by the Society.

The subcommittee recommended that Methods D 2207, D 2208, D 2209, D 2210, D 2211, and D 2212 be reapproved and continued as standards. This has been done under the Interim Procedure.

Subcommittee A-4 on Water Resistance (Murrel Brown, chairman) reviewed Method D 1815, Test for Water Absorption (Static) of Leather, and recommended that the note under Scope be deleted as not having relevance.

Letter ballot on the acceptability as standard methods of the two dynamic water resistance methods, D 2098 (Dow Corning) and D 2099 (Maeser), revealed one objection for each method. This objection stated that neither method defined the nature of the developed water resistance, whether obtained from the finish proper or as a result of an in-depth treatment. The subcommittee felt that this definition was beyond the scope and intent of the methods, and voted not to include a statement, either as an amendment or footnote. This was approved by a voice vote of 37 to 0 of the Joint Committee at the general meeting, and submitted to the Society for Interim Action.

Reports from participants in screening modifications of the tumble test for determination of water absorption, revealed several improvements that should increase the accuracy and reproducibility of the method. These will be evaluated in another interlaboratory test.

Subcommittee A-5 on Surface Characteristics (Robert Stubbings, chairman) has made considerable progress toward the development of a method for measuring the wet- and dry-crock characteristics of leather,

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using the Muller Crockmeter. The draft of the procedure was returned by Subcommittee I to resolve an objection concerning the description of the wetting procedure for wet cloths. Mr. Muller informed the group that he could no longer supply the instrument except in lots of 12. Dr. Stubbings has learned that the Haubert Machine Co. in Milwaukee will build the instrument and he will be glad to supply information about price and delivery.

The subcommittee has also developed a method for measuring the bleed characteristics of colored leather. Munsell color standards are the basis for evaluating the degree of staining appearing on the bleed cloths. Collaborative tests showed excellent agreement between laboratories with the exception of one collaborator. Resolution of this discrepancy should place the method in shape for acceptance.

Work on developing a scuff tester has led the subcommittee to conclude that the instruments should be equipped with diamond blades. These are now being constructed and will be subjected to testing for reproducibility.

The subcommittee is conducting exploratory tests on a method for finish adhesion that had been developed by the K. J. Quinn and Co. Discussions were also held on the problem of water spots on grain leather. In a discussion of gloss on leather the group concluded that gloss meter readings were not necessarily correlated with appearance.

Subcommittee A-8 on Deterioration (E. M. Filachione, chairman) did not meet.

Subcommittee A-10 on Miscellaneous Properties (M. Bailey, chairman) completed collaborative testing on the Satra method for measuring break. There was no appreciable difference between specimens wrinkled by Maeser flexing versus those bent by manual flexing. Average differences did not exceed plus or minus one grade. Half grades were permitted by the testing participants. It was agreed to writeup the method for presentation to the Editorial Committee with appropriate statement of precision and accuracy.

The subcommittee has recommended that the method for Measuring Break Pattern of Leather based on the Grainometer be published for information. This was submitted to the Society under the Interim Procedure.

Subcommittee A-11 on Bonding (O. O. Weber was the late chairman) has maintained contacts with ASTM Committee D-14 on Adhesives and the New England Footwear Association, Inc. The general objective of this subcommittee is to develop a test procedure that will enable tanners and shoe manufacturers to evaluate the suitability of various upper leathers for use in rubber-soled cement shoes where sole attaching is done with neoprene cements.

A round-robin test was initiated among four laboratories using leathers from four sources. The results showed that, except for one stuffed leather (26 percent grease), all bonded satisfactorily regardless of oil and silicone contents up to 22 percent. However, since high oil contents have been troublesome in shoe factories, the uniformly good bonds attained by the present test method raised the question as to whether the conditions of the test adequately met shoe factory operating conditions. Further testing will be initiated under conditions simulating factory conditions.

Subcommittee A-12 on Lastability (Richard Oris, chairman) is conducting studies on the development of methods to predict the lastability of leather. Leathers obtained from three tanners as representative of three levels of lastability were evaluated by means of physical tests at two laboratories, by making the leathers into combat boots with direct molded soles at a shoe factory. The boots were classified as to whether the lastability was satisfactory or unsatisfactory. The committee will correlate these data with physical tests.

B. Chemical Testing Group

Subcommittee B-1 on Chemical Analysis (J. A. Reid, chairman) has developed a method for the determination of the Nitrogen Content (Kjeldahl) and Hide Substance of Leather (D 2868). This has been submitted to the Society under Interim Action. The method for determining Volatile Matter (Moisture) of Leather by Oven Drying is undergoing round-robin testing. The subcommittee is screening several possible methods for the determination of silicones in leather.

Subcommittee B-2 on Oils and Greases (C. Retzsch, chairman) is developing a

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method of test for determining the solvent extractable matter in leather.

Subcommittee B-3 on Vegetable Leathers (W. T. Roddy, chairman) has developed the following three methods of analysis for constituents of vegetable tanned leathers: Test for Soluble Non-Tannin and Uncombined Tannins, Test for Water Soluble Matter (D 2876), and Test for Insoluble Ash (D 2875). These have been submitted to the Society under Interim Action. The subcommittee developed a report on the reproducibility and accuracy of these test methods in analyzing vegetable tanned leathers. It is intended to have this published. The subcommittee discussed the possibility of developing a method on the correct sampling procedure for the chemical analysis of leather. This was referred to Subcommittee II.

Subcommittee IV on Research (L. D. Koch, chairman) arranged for discussions on the problem of shoe factory customer re-

turns and the moisture content of leather for shoe making.

Subcommittee VI on International Methods (J. Naghski, chairman) continues to review drafts of methods originated by the Pan American Committee on Standards (COPANT), the International Organization on Standards (ISO), and other sources submitted by the American National Standards Institute (ANSI). Comments and suggestions were offered to ANSI for use in reply.

This report has been submitted to letter ballot of the committee, which consists of 40 voting members; 29 members returned their ballots, of whom 29 have voted affirmatively and 0 negatively.

Respectively submitted on behalf of the committee,

ROBERT STUBBINGS,
Chairman

J. NAGHSKI,
Secretary

REPORT OF JOINT COMMITTEE ON ATOMIC AND MOLECULAR PHYSICAL DATA

The Joint Committee on Atomic and Molecular Physical Data held one main meeting during the year on March 4, 1969, in Cleveland, Ohio. The Executive Council held meetings on March 4, 1969, in Cleveland, Ohio, on July 7, 1969, in Gaithersburg, Md., and on Nov. 19, 1969, in New York City.

The Joint Committee considered the possibility of taking over a computer exchange library service presently maintained by the Perkin-Elmer Corp., but there are many problems tied to it: the programs are often written for a specific application or are poorly documented; the programs are often of a proprietary nature; there is a problem of who would be a repository for such a library. As ASTM is considering forming a new technical committee on computerized laboratory data, it was felt this might be a logical place for such a project.

A. L. Smith, D. Camin, and R. M. Sherwood were re-elected as chairman, vice-chairman, and secretary respectively. Drs. Potts and Shapiro were reappointed chairmen of the infrared and NMR subcommittees respectively.

ACTIVITIES OF SUBCOMMITTEES

IR Subcommittee—In the Class III evaluated infrared spectra project, Set 6 was completed and sold 82 hard copies plus 7 on microfilm as of February 1970.

In the Class II spectra project, there have been 69 pure samples donated with seven laboratories agreeing to participate. So far, 125 spectra have been run.

NMR Subcommittee concluded that a critical literature index of NMR spectra should be undertaken. Also needed are definitive performance tests for spectrometers.

Raman Subcommittee (E. Lippincott, chairman) agreed that instrument standardization and specification for evaluating spectra are needed. Future effort will be devoted to these needs.

Mass Spectrometry Subcommittee (R. Harless, chairman) felt that this group should contribute ideas and give support to activities of ASTM Committee E-14 and to the newly formed American Society for Mass Spectrometry (ASMS).

Microwave Subcommittee—This is the most recently formed subcommittee and is chaired by Dr. W. F. White of the Langley Research Center at Hampton, Va. The subcommittee has not yet had the opportunity to meet.

Respectfully submitted on behalf of the committee,

A. L. SMITH,
Chairman

R. M. SHERWOOD,
Secretary

REPORT OF SPECIAL COMMITTEE ON NUMERICAL REFERENCE DATA

During the past year, the Special Committee on Numerical Reference Data held one meeting of the main committee and several meetings of subcommittees.

The Conference Subcommittee (F. Y. Speight and A. C. Schaefer, co-chairmen) held a very successful conference on "Characterization of Structural Materials for Engineering Design" in the auditorium at ASTM headquarters, on November 5th. Of the five papers presented, two have already appeared in *MR&S*, a third will appear in the April issue, and a fourth is being reviewed by the author and will appear soon. The fifth will require major revision before it can be published.

The Manual Subcommittee completed revision of the manual entitled "A Manual on Methods for Retrieving and Correlating Technical Data" (principally the work of F. E. Dyke, Jr.). Aside from fulfilling its primary function of informing ASTM technical committees, the manual is being sold as *STP 468*. To date only 300 have been sold.

The CODEN Subcommittee has done well. A definitive volume (including all CODEN for scientific periodicals, is being prepared for publication. It is estimated that it will be printed in September. All the data are being put on magnetic tape from which the printing will be done. In addition to the printed books, reproductions of the magnetic tape will be available for rental (inquiries have already been received). This work is being done at Franklin Institute with which ASTM has a contract for the maintenance of CODEN till February 1971. It is hoped that the Library of Congress will take over CODEN at that time. Mr. T. A. Marshall was informed that they are willing if financing is available. Since that letter, the Library of Medicine has offered to share the costs, so

that the only impediment is the uncertainty of ANSI adopting CODEN.

The probability of ANSI adopting CODEN (or a mathematical conversion of it) is better now than it has been, because Subcommittee 20 of ANSI committee Z39 has been discharged as a result of Mr. Marshall's complaint concerning the conduct of the subcommittee; and a new subcommittee with a new sponsor will be appointed.

The CODEN Subcommittee has revised E 250 "Recommended Practice for Use of CODEN for Periodical Titles." The revision has received the unanimous affirmative vote of the committee, and is now being set in type. It is anticipated that the final copy can be sent to ANSI within two months, to support ANSI's standard on periodical references.

The Subcommittee on Microfilm Usage, Standards, and Techniques (under the chairmanship of M. J. Ruterbusch) reviewed the microfilm section of the manual, and decided that it would suffice, and that they should not delay publication of the manual. However, in the near future, the subcommittee is going to start work on a revised and expanded version, that can be published on its own or incorporated in a revision of *STP 468*. This subcommittee will also act as an advisory committee to the publication committee in regard to the use of microfilm for ASTM publications. (See discussion below on reorganizations of the Special Committee on Numerical Reference Data.)

In regard to the Subcommittee on Data for Engineering Materials, things are now in a state of flux. Dr. Waddington (the chairman) who had planned to spend a lot of time on the work of this committee during 1969, accepted new responsibilities with CODATA, which required much time and travel. Moreover, Dr. Waddington is soon going to retire

REPORT ON NUMERICAL REFERENCE DATA

completely, and it will be necessary to reorganize the subcommittee. (See the proposal below.)

Last year's report briefly outlined a proposed reorganization of the Special Committee on Numerical Reference Data, dividing the committee into two parts, each of which would be headed by a vice-chairman. This was not done because of a meritorious suggestion by Mr. Etris. The Special Committee on Numerical Reference Data recently recommended changes to the Executive Committee. The Special Committee on Numerical Reference Data should be continued with greatly reduced scope. It would be concerned with projects for data on engineering materials, both within ASTM and in cooperation with other organizations. The committee would remain a special committee reporting to the board. It is important for ASTM to have such a committee, because data on engineering materials is increasingly important and is not covered by the National Standard Reference Data System (limited to pure compounds), nor the Academies, nor by EJC. (The Office of Critical Tables is defunct.) Several organizations here and abroad are now considering future activities in this field, and it is important for ASTM to take part in this planning, and then in the implementation of those plans.

The other present subcommittees would no longer be a subcommittees of the Special Committee on Numerical reference Data, but would become subcommittees of other committees.

The Subcommittee on Printing Methods and Format, the Subcommittee on Microfilm Usage, Standards, and Techniques, the Subcommittee on the Manual, and the Subcommittee on CODEN would all become subcommittees of the publications committee. The Subcommittee on Conferences would become a subcommittee of the meetings committee.

As the Board knows, the committee chairman served as one of ASTM's representatives on the Technical Societies Advisory Panel to the Tripartite Committee. The three parent organizations all turned down the proposal of the Tripartite Committee, and the panel is no longer in existence. The resulting situation emphasizes the importance of ASTM having a committee which can participate in the next move.

Respectfully submitted on behalf of the committee,

W. L. FINK,
Chairman

R. G. SIMARD,
Secretary

REPORT OF SPECIAL COMMITTEE ON MATERIALS INSPECTION AND TESTING LABORATORIES

The Special Committee on Materials Inspection and Testing Laboratories held one meeting since the last report, this being on 12 June 1969 at ASTM Headquarters. Previous to this meeting a series of three meetings of a specially appointed Steering Group on Testing Agency Inspection Service, were held on 22 April in Washington, D. C., and 14 May 1969 at ASTM Headquarters. No changes in membership were made during the period of this report.

Recommended Practice for Inspection and Testing Agencies for Concrete and Steel As Used in Construction (E 329)—Several minor changes, primarily editorial in nature, were approved and the revised form was submitted to the Society for adoption as standard, which action was approved effective May 29, 1970. Proposed additional sections to E 329 were considered which would broaden the scope of the recommended practice to include bituminous materials, soils, and nondestructive testing. A separate recommended practice for inspection and testing agencies for wood and related wood products has also been prepared and is in its second draft form. Similarly a first draft of a recommended practice to cover nondestructive testing generally has been made available through the cooperation of Committee E-7 on Nondestructive Testing, Committee D-22 on Sampling and Analysis of Atmospheres has

accepted the assignment of preparing a recommended practice in the field of air pollution inspection and testing agencies.

Testing Agency Inspection Service—The establishment of a nationally qualified authority to serve as a checking agency on all inspection and testing laboratories has been considered to be the next significant phase of the work of the Special Committee. This has been felt to be sufficiently important to justify the postponement of the expansion of E 329 and the development of other recommended practices until some resolution has been made to this matter. The special Steering Group has met with the Director and Deputy Director of the National Bureau of Standards for the purpose of determining the feasibility of an expansion of the activities of the Cement and Concrete Reference Laboratory to encompass the additional assignment. A formal proposal has been submitted to the Bureau. At this writing of the report no reply has been received. It is known that the Bureau has been studying and analyzing the proposal and indications to date have been favorable.

Respectfully submitted on behalf of the committee,

R. R. LIEHISER,
Chairman

L. C. GILBERT,
Secretary

REPORT OF SPECIAL COMMITTEE ON METRIC PRACTICE

The Special Committee on Metric Practice held three meetings during the year: on May 6, August 19, and November 5, 1969, all at ASTM Headquarters. W. R. Shelton was replaced as a member of the committee by G. A. Remley who was later replaced by Hugh Winn. A. G. Cook, chairman, also resigned and was replaced by R. N. Johnson. J. D. Graham accepted appointment as the new chairman.

The work of the committee consisted of revising the Metric Practice Guide, issued as E 380 in 1968. Revisions included updating in accordance with the 13th General Conference on Weights and Measures. Sections that included conversion information pertinent only to ASTM committees were deleted for inclusion in a separate publication, and other sections were clarified. Several conversion factors were corrected. A number of

these revisions were the result of comments received during balloting of E 380-68 for adoption as an American National Standard. The revised Guide successfully passed committee and Society letter ballots and was accepted by the Society effective March 19, 1970.

The next work of the committee will be to review the Instructions to ASTM Technical Committees on Metric Conversion, now being prepared by Staff, and to review any comments from the field on the revised Guide.

Respectfully submitted on behalf of the committee,

J. D. GRAHAM,
Chairman

R. P. LUKENS,
Secretary

REPORT OF THE INTERSOCIETY RELATIONS COMMITTEE ON AACC, AOAC, AOCS, ASTM

The Intersociety Relations Committee held one meeting in 1969, at ASTM Headquarters on 24 November. In accordance with the policy of rotating the chairmanship of the committee among the member societies, Dr. R. T. O'Connor, chairman of the American Oil Chemists' Society delegation, was elected for the 1970-1971 term. Dr. Willets and Dr. C. L. Ogg, representing the Association of Analytical Chemists, served as chairman in 1968 and in 1969, respectively.

At the November 1969 meeting, arrangements were made for the preparation of a summary report on the history of the committee, a statement of its objectives, and a plan for the achievement of those objectives—with publication of the report in the journals of the four member societies and distribution of copies of the report to technical committee chairmen in these societies. This report has been substantially completed by Dr. O'Connor. The plan for achievement of the objectives of the committee is summarized in the following quotation from Dr. O'Connor's report:

"When the chairman of a technical or working committee plans to inaugurate a detailed investigation involving collaborative testing to devise or select an analytical procedure to be recommended to his Society as an official or standard method he will notify the Intersociety Relations Committee representative (or contact man) of his Society. If the investigation is to be conducted under the direction of a Subcommittee Chairman or a Task Group Chairman selected for this

specific purpose, he shall report through the chairman of his committee, who will notify the Society's representative. The Society's representative will inform the permanent recording secretary that either they have ascertained that no interest in the proposed method has been found within their Society or that a specific Committee is interested in the investigation proposed and that contacts should be made within . . . giving the name and address of the contact (technical or working committee chairman) directly interested in joining in the proposed investigation. The representative of the Society initiating this action refers these comments to the Committee Chairman who initiated the request and thus contact between or among committee chairmen is established—or it has been established that if a specific committee of the initiating Society does proceed it is not duplicating effort being pursued in one of the other member-societies."

The four key contact men are as follows:

Wilbur C. Schaefer (AACC)

Dan L. Henry (AOCS)

Luther G. Ensminger (AOAC)

Maurice D. Huber (ASTM)

The above report by Dr. O'Connor will be reviewed by the four societies and released for publication soon.

Respectfully submitted on behalf of the committee,

R. T. O'CONNOR,
Chairman

M. D. HUBER,
Secretary

1970 LIST OF SPECIAL TECHNICAL PUBLICATIONS AND DATA SERIES PUBLICATIONS

The publications listed below were published during 1970 as separate publications not included in either *Proceedings* or *Materials Research & Standards*. For a list of earlier Special Technical Publications see the listings on the last page of *Proceedings*, Vol 49 (1949) to Vol 68 (1968). Also a complete list of Special Technical Publications covering all publications, up to and including 1950, is included in the 50-Year Index to ASTM Publications, and complete lists up to and including 1965 are published in the three succeeding 5-Year Indexes to ASTM Publications covering the years 1951-1955, 1956-1960, and 1961-1965.

STP Number	Title	DS Number	Title
371 S1	Direct-Current Magnetic Measurements for Soft Magnetic Materials	DS 9E	Compilation of Chemical Compositions and Rupture Strengths of Superalloys
457	Irradiation Effects in Structural Alloys for Thermal and Fast Reactors	DS 23B	CODEN for Periodical Titles—Vol I, Vol II
458	Applications-Related Phenomenon in Zirconium and Its Alloys	DS 37A	X-Ray Emission and Absorption Wavelengths and Two-Theta Tables
460	Composite Materials: Testing and Design	DS 46	X-Ray Emission Wavelengths and KEV Tables for Nondiffractive Analysis
462	Effects of Environment and Complex Load History on Fatigue Life	<i>Miscellaneous</i>	
463	Review of Developments in Plane Strain Fracture Toughness Testing	Proposed Methods of Test for Knock Characteristics of Motor Fuels	
464	Fire Test Performance	1970 Building Codes Compilation	
465	Manual on Low-Cycle Fatigue Testing	1969 LIST OF SPECIAL TECHNICAL PUBLICATIONS AND DATA SERIES PUBLICATIONS (Omitted from 69 <i>Proceedings</i>)	
466	Impact Testing of Metals	STP Number	Title
467	Achievement of High Fatigue Resistance in Metals and Alloys	459	Fatigue at High Temperature
470	Manual on the Use of Thermocouples in Temperature Measurement	468	A Manual on Methods for Retrieving and Correlating Data
471	The Laboratory Handling and Storage of Peroxy Compounds	469	Damage in Laser Glass
472	The Reaction Parameters of Lime	475	Nomenclature and Definitions Applicable to Radiometric and Photometric Characteristics of Matter
473	Fineness of Cement		
474	Characterization and Determination of Erosion Resistance		
476	Advance Testing Techniques		
477	Determination of the In Situ Modulus of Deformation of Rock		
478	Appearance of Metallic Surfaces		
479	Special Procedures for Testing Soil and Rock for Engineering Purposes		

